

PLANNING COMMISSION STAFF REPORT

REPORT DATE:

September 1, 2011

AGENDA DATE:

September 8, 2011

PROJECT ADDRESS: End of Mesa Lane (MST2011-00280)

Lower Mesa Lane Stairs

TO:

Planning Commission

FROM:

Planning Division, (805) 564-5470

Danny Kato, Senior Planner

Jan Hubbell, AICP, Parks Project Manager

I. **PROJECT DESCRIPTION**

A. The Project. The proposed project involves replacement of a portion of the Mesa Lane Stairs and its foundation on the beach that are damaged due to wear and tear from the beach tidal environment and the types of rebar and concrete used in its construction. The stairs have existed since 1982 and are an important beach access for Mesa residents. The existing stairs and support structures will be replaced with new stainless steel stairs and handrails, supported by 12" diameter stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The existing concrete stairs will be replaced with new concrete stairs that will be founded about 4.5 feet into bedrock. The lower part of the stainless steel stairs will be supported by 12" diameter stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The concrete will be a specific mix that is less subject to erosion by sea water and the rebar will be covered in a special epoxy to minimize rust. The total footprint at beach level will be about 50 sq. ft.

Project Construction Approach. It will be necessary to entirely close the stairs for the В. duration of construction. Construction will take about three (3) months, from the day after Labor Day to no later than November 30th. Depending on funding, construction should occur in 2012 or 2013. Construction staging will be at Arroyo Burro Beach County Park in the overflow parking area. Most construction activities will use the beach to access the construction area. Access for most of the construction equipment would be from the staging area around the westerly side of the Boathouse restaurant and along an existing ramp to the beach, across the mouth of Arroyo Burro Creek, and easterly along the beach. It is possible that a small amount of sand would need to be added to the access ramp west of the Boathouse. One piece of equipment may also need to "walk" over the rocks on the easterly side of the restaurant. eucalyptus trees 300 feet to the west of the stairs may need to be removed in order to

access the site. Access to and from the construction site will occur only during low tide and would not occur for at least two days following a rain event of one inch or greater. A biological monitor would be present if any water is flowing at the estuary mouth to prevent any impacts to sensitive species or water quality. Concrete trucks may pump concrete from the top of the stairs. If so, they will be required to park on the path to the stairs to retain vehicular access at the intersection of Mesa Lane and Edgewater Way. Provisions have been included in the detailed project description to avoid any effects from crossing the mouth of Arroyo Burro Creek, traveling along the beach, and staging at the overflow parking area. All of the work at the project site will occur above the Mean High Tide line. A detailed Project Description is included in Exhibit 3 of the Applicant's Letter to Planning Commission, Exhibit C of this report.

II. REQUIRED APPLICATIONS

The discretionary application required for this project is a <u>Coastal Development Permit</u> (CDP2011-00010) to allow the proposed development in the Appealable Jurisdiction of the City's Coastal Zone (SBMC §28.44.060);

III. RECOMMENDATION

The proposed project conforms to the City's Zoning and Building Ordinances and policies of the Local Coastal Plan. In addition, the project has been designed to minimize environmental effects during and after construction. Therefore, Staff recommends that the Planning Commission approve the project, making the findings outlined in Section VII of this report, and subject to the conditions of approval in Exhibit A.



APPLICATION DEEMED COMPLETE: DATE ACTION REQUIRED:

July 22, 2011 October 20, 2011

IV. <u>SITE INFORMATION AND PROJECT STATISTICS</u>

A. SITE INFORMATION

Lot Area:	NA
7 !	
Zoning:	E-3/S-D-3, Single-Family Residence/Coastal Overlay Zone
Topography:	Stairs go down 140' bluff; work area is on the beach
	opography:

V. ZONING ORDINANCE CONSISTENCY

The proposed project will meet the requirements of the E-3/S-D-3, Single Family Residence/Coastal Overlay, Zones.

VI. ISSUES

A. **DESIGN REVIEW**

This project was reviewed by the ABR on one occasion (meeting minutes are attached as Exhibit D). On July 25, 2011, the ABR forwarded the project to the Planning Commission with positive comments on the aesthetics and a request to minimize vehicle access across the beach to the construction site as much as possible.

B. COMPLIANCE WITH THE GENERAL PLAN AND LOCAL COASTAL PLAN

The Mesa Lane Stairs are in Component Two of the LCP and the West Mesa Neighborhood, which are bounded by existing development along Cliff Drive on the north, the Pacific Ocean on the south, on the east by Meigs Road, and on the west by Arroyo Burro County Beach Park. Most of the West Mesa is designated for single family residential development. The major coastal issues identified for Component Two include seacliff retreat and flooding hazards; public access, both vertically and laterally along the bluffs, overuse of public facilities, protection of recreational access, protection of archaeological resources and maintenance of existing coastal views and open space.

A Phase I Archaeological Report prepared for the original construction of the stairs concluded that there are no archaeological resources in the area. No changes are proposed to the upper part of the stairs; thus, there will be no change in the rate of seacliff retreat.

<u>Public/Coastal Access</u>: The purpose of the project is to maintain and enhance the longevity of the Mesa Lane Stairs, a public coastal access called for by the LCP (LCP Policy 2.1 and Coastal Act Policy 30210). Project construction will require the stairs to be closed during construction, which will require users to travel to other coastal access points in the area at Arroyo Burro Beach and Camino al Mar Stairs for a period of about three months. Construction would start after Labor Day in order to avoid the high beach use in the summer. There is no safe way to keep the stairs open during construction, since the bottom flight of stairs will be entirely removed and replaced. Parks and Recreation staff will take the opportunity to carry out maintenance of the upper part of the stairs while they are closed for construction. Depending on what they find, this could include replacing damaged components (steps, connecting brackets, etc.), painting or other maintenance.

<u>Views</u>: The scenic and visual qualities of coastal areas should be considered as a resource of public importance (Coastal Act Policy 30251). The views of the stairs from the ocean and beach will be improved because the large concrete block supporting the landing will be removed and will not be replaced. This will remove a large surface that has been subject to graffiti. The ABR, as noted above, stated that the project is acceptable aesthetically.

Marine Resources: Coastal Act Policy 30230 calls for protection of marine resources in coastal waters. Policy 30231 calls for protection of biological productivity and quality of coastal

waters, streams, wetlands, estuaries, and lakes. Policy 30232 requires protection against the spillage of petroleum products and other hazardous substances, including effective containment and cleanup of any accidental spills.

The detailed project description attached to the Applicant's letter (Exhibit C) includes a detailed Construction Best Management Plan that will minimize any effects by demolition and construction on Arroyo Burro Creek and the ocean, as well as any sensitive species in the area. Best Management Practices (BMPs) include:

- No storage of materials or debris where it could be subject to wave, wind, rain, or tidal erosion and dispersion;
- Removal of all construction and demolition debris and sediment with 72 hours of project completion, including securing such debris within containment areas each day;
- No mechanized equipment storage on the beach;
- Construction materials to be covered and enclosed;
- No access to the project site via the beach during and for two days following a one-inch or greater rain event; and
- A biological monitor will be required whenever Arroyo Burro Creek is flowing to the ocean.

Additionally, the Project Description includes a Spill Prevention and Containment Plan to prevent spillage and/or runoff of construction and demolition-related materials. Measures include:

- Designated fueling and vehicle maintenance area with berms and protection to prevent any accidental spillage from running off into the creek or ocean;
- Designated equipment and machinery wash area to control runoff, including concrete trucks; and
- Any residues of gasoline, lubricants, or other petroleum-based products that may drop on the beach as equipment moves to and from and at the construction site will be reported to the Planning Division to assure proper disposal.

The Project Description also requires submittal of a construction staging plan, which will be reviewed by County Parks staff, and calls for the staging area to be reduced as fewer materials and equipment are necessary. It also requires that the construction access route on the beach will only be intermittently closed for equipment and materials transport. Closure of Cliff Drive is not expected to be necessary. Otherwise, park and beach access will remain open. It may be necessary to place sanitary fill over the rock revetment west of the restaurant to improve the turn radius for certain equipment. If so, removal of the fill will be required at the construction completion.

It is possible that concrete will be poured for the piles and stairs via concrete trucks stationed at Mesa Lane, using a pump system. If the pump system is not used, concrete will be trucked

down the beach. If the Mesa Lane approach is used, concrete trucks will not be allowed to arrive at Mesa Lane before 8:00 AM. Additionally, a condition has been included requiring that concrete trucks not block vehicular access through the intersection of Mesa Lane and Edgewater Lane. Parks and Recreation staff have indicated that they will take the opportunity to inspect and carry out other stair maintenance projects while the stairs are closed to the public.

Although the above requirements, among others, are clearly stated and included in the Project Description, staff is also including the requirements as Conditions of Approval (Exhibit A) to help assure their inclusion in the final plans. Finally, a condition has been added that requires construction to be halted on any day that a very high tide might affect the construction site so that work does not take place in tidal waters. Prior to issuance of Public Works or Building Permits, the contractor will work with the coastal engineer to determine which high tides, if any, will disrupt the construction site, and construction will be prohibited on those days.

Coastal Act Policy 30235 requires that structures that alter natural shoreline processes are permitted only when required to serve coastal-dependent uses or to protect existing structures and public beaches and when they are designed to minimize impacts to the shoreline and sand supply. The proposed project would serve to continue the coastal dependent use of beach access at the existing steps.

The new design will eliminate this concrete mass foundation, reducing erosion and restoring much of the natural wave scour. The Coastal Engineering Report further states that this option (among others studied) "neither creates nor contributes significantly to erosion, instability, or destruction of the site or surrounding areas."

Land Resources: Coastal Act Policy 30240 requires protection of environmentally sensitive As noted above, a number of provisions have been written into the Project habitats. Description to minimize any effects on environmentally sensitive habitats (creeks, intertidal zone) and species. The primary sensitive species in the area is the federally endangered tidewater goby. According to Rosemary Thompson, an experienced biologist with Cardo-Entrix, when water flows from the creek are low to non-existent, the gobies generally stay at the upper end of the estuary, near the bridge over Cliff Drive. They only move to the ocean end of the estuary when forced by high creek flows to do so. This is the reason that no beach access across the creek mouth will be allowed during or for two days following a major storm (one inch or more of rain) and for the presence of a biological monitor if Arroyo Burro Creek is flowing to the ocean at any time during construction. The project construction period has been timed to end before December 1st, which starts the period when the federally endangered southern steelhead trout could possibly attempt to enter the estuary during high rain events when the mouth of the estuary is flowing to the ocean. Additionally, construction is timed to start after the end of the grunion and bird nesting seasons, which end in August.

In the unlikely event that the biological monitor should find either tidewater goby or southern steelhead trout in the area of the construction crossing, work would be halted and the biologist would consult with the applicant and the City's environmental analyst to determine the best method for avoidance of any impacts to these species.

<u>Hazards</u>: Coastal Act Policy 30253 and LCP Policy 8.2 require that any construction on the bluff be limited to public beach accessways and pipelines and that such structures be engineered to minimize alteration to or impacts on the bluff and beach. As noted above, the Coastal Engineering Report found that the new design will actually reduce impacts on the bluff from tidal action. Additionally, a Geotechnical Memorandum prepared for the project (Exhibit G) concludes that the project will not have any negative geological impacts on the bluff or beach. The Coastal Engineering Report (Exhibit F) states that:

"During high tide and surf conditions the existing concrete mass foundation is large enough to substantially deflect wave uprush to the sides this significantly adding to the erosion of the bluffs to the sides of the staircase, especially that portion of the bluff immediately to the west of the staircase. The existing concrete mass foundation blocks a significant amount of wave uprush from reaching the bluff directly landward of the foundation crating a wave uprush shadow zone, and significantly altering the natural wave scour and erosion of the bluff face."

The Coastal Engineering Report analyzed three options and concluded that "each of these options has less of an effect on the coastal processes than the concrete mass pedestal foundation that currently exists ... Each of these options neither creates nor contributes significantly to erosion, instability, or destruction of the site or surrounding areas."

C. ENVIRONMENTAL REVIEW

Staff has determined that the project is categorically exempt from further environmental review pursuant to California Environmental Quality Act Guidelines Section 15302 (replacement or Reconstruction). Section 15302 allows for reconstruction of existing facilities when the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity of the existing structure. Additionally, construction staging and access have been designed to minimize effects on the mouth of Arroyo Burro Creek and along the beach. As discussed in detail in Section B above, the project has been designed to avoid significant impacts to visual, biological, geological, water, quality, recreational, and shoreline resources. Construction noise will occur primarily at the base of the bluff, which is 140 feet below the Mesa and the surrounding residences. The only noise that could affect residents would be from concrete trucks pumping concrete to the beach from the top of Mesa Lane. This would occur for only a small portion of the construction period and would be required to follow City noise ordinance requirements for construction. Traffic impacts would only occur as a result of construction. These impacts would occur primarily from moving construction equipment through the Cliff Drive/Las Positas Road intersection, generally no more than one or two larger vehicles. Most of the construction traffic will occur outside the peak hour, except when it is necessary to access the site during a low tide that coincides with peak hours. They would be temporary and would result in less than significant impacts.

VII. FINDINGS

The Planning Commission finds the following:

COASTAL DEVELOPMENT PERMIT (SBMC §28.44.150)

- 1. The project is consistent with the policies of the California Coastal Act because:
 - a. The project retains and extends the life of Mesa Lane Stairs, a coastal access strongly supported by the LCP and the Coastal Act.
 - b. The project is designed to minimize effects on coastal and marine resources, including the beach and Arroyo Burro Creek, as well as environmentally sensitive habitats and species.
 - c. The project is designed to reduce alteration of natural shoreline processes and the project itself is a coastal dependent use that has been designed to minimize impacts to the shoreline and sand supply. The proposed project would serve to continue the coastal dependent use of beach access at the existing steps.
- 2. The project is consistent with all applicable policies of the City's Local Coastal Plan, all applicable implementing guidelines, and all applicable provisions of the Code for the reasons expressed in Section VI.B of the staff report.

Exhibits:

- A. Conditions of Approval
- B. Site Plan
- C. Applicant's letter, dated June 30, 2011 (with Exhibits 1 and 3)
- D. ABR Minutes, dated July 25, 2011
- E. Applicable General Plan/Local Coastal Plan Policies
- F. Coastal Engineering Report, prepared by Pacific Engineering Group, March 23, 2011
- G. Geotechnical Memorandum, prepared by Bengal Engineering, March 10, 2011

PLANNING COMMISSION OFFICER CONDITIONS OF APPROVAL

END OF MESA LANE (MST2011-00280) COASTAL DEVELOPMENT PERMIT SEPTEMBER 8, 2011

- I. In consideration of the project approval granted by the Planning Commission and for the benefit of the owners and occupants of the Real Property, the owners and occupants of adjacent real property and the public generally, the following terms and conditions are imposed on the use, possession, and enjoyment of the Real Property:
 - A. **Order of Development.** In order to accomplish the proposed development, the following steps shall occur in the order identified:
 - 1. Obtain all required design review approvals.
 - 2. **Permits.** Make application and obtain a Public Works Permit (PBW) for all required public improvements, subject to review by the Building Division to assure California Building Code compliance. Comply with Condition F: "Construction Implementation Requirements."

Details on implementation of these steps are provided throughout the conditions of approval.

B. Approved Development. The development of the Real Property approved by the Planning Commission on September 8, 2011 is limited to replacement of a portion of the Mesa Lane Stairs and its foundation on the beach that are damaged due to wear and tear from the beach tidal environment and the types of rebar and concrete used in its construction, and the improvements shown on the plans signed by the chairman of the Planning Commission on said date and on file at the City of Santa Barbara. The existing stairs and support structures would be replaced with new stainless steel stairs and handrails, supported by 12" diameter stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The existing concrete stairs would be replaced with new concrete stairs that would be founded about 4.5 feet into bedrock. The lower part of the stainless steel stairs would be supported by 12" diameter stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The concrete would be a specific mix that is less subject to erosion by sea water and the rebar would be covered in a special epoxy to minimize rust. The total footprint at beach level would be about 50 sq. ft. It will be necessary to entirely close the stairs for the duration of construction. Construction will take about three (3) months, from the day after Labor Day to no later than November 30th. Depending on funding, construction should occur in 2012 or 2013. Construction staging will be at Arroyo Burro Beach County Park in the overflow parking area. construction will use the beach to access the construction area. It is possible that a small amount of sand would need to be added to the access ramp west of the Boathouse. Two dead eucalyptus trees 300 feet to the west of the stairs may need to be removed in order the access the site. Concrete trucks may pump concrete from the top of the stairs. If so, they will be required to park on the path to the stairs to retain vehicular access at the intersection of Mesa Lane and Edgewater Way.

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- C. Water Flow. The Owner shall provide for the continuation of any historic uninterrupted flow of water onto the Real Property including, but not limited to, swales, natural watercourses, conduits and any access road, as appropriate.
- D. **Design Review**. The project, including public improvements, is subject to the review and approval of the Architectural Board of Review (ABR). The ABR shall not grant project design approval until the following Planning Commission land use conditions have been satisfied.
- E. Requirements Prior to Permit Issuance. The Owner shall submit the following, or evidence of completion of the following, for review and approval by the Department listed below prior to the issuance of any permit for the project. Some of these conditions may be waived for demolition or rough grading permits, at the discretion of the department listed. Please note that these conditions are in addition to the standard submittal requirements for each department.

1. Public Works Department.

- a. **Drainage and Water Quality.** The project is required to comply with Tier Two of the Storm Water Management Plan. The Owner shall submit worksheets from the Storm Water BMP Guidance Manual for Post Construction Practices prepared by a registered civil engineer or licensed architect demonstrating that the new development will comply with the City's Storm Water Management Plan. Project plans for grading, drainage, stormwater facilities and treatment methods, and project construction, shall be subject to review and approval by the Public Works Department. Sufficient engineered design and adequate measures shall be employed to ensure that no significant construction-related effects from increased runoff, erosion and sedimentation, urban water pollutants (including, but not limited to trash, bacteria, etc.), or groundwater pollutants would result from the project.
- b. **Haul Routes Require Separate Permit.** Apply for a Public Works permit to establish the haul route for all construction-related trucks with a gross vehicle weight rating of three tons or more entering or exiting the site. The Haul Routes shall be approved by the Transportation Manager.
- c. Construction-Related Truck Trips. Construction-related truck trips for trucks with a gross vehicle weight rating of three tons or more shall not be scheduled during peak hours (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.) in order to help reduce truck traffic on adjacent streets and roadways unless necessary to enter the construction site during low tide periods.
- d. **Encroachment Permits.** Any encroachment or other permits from the City or other jurisdictions (State, Flood Control, County, etc.) for the construction of improvements (including any required appurtenances) within their rights of way or easements shall be obtained by the Owner.

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2. Community Development Department.

- a. Condition Compliance Monitor Required. Submit to the Planning Division a contract with a qualified independent consultant to act as the Condition Compliance Monitor (CCM) or a work program prepared by a qualified City staff person. Both the CCM and the contract/work program are subject to approval by the City Planning staff. The CCM shall be responsible for assuring full compliance with the Conditions of Approval to the City. The contract/work program shall include the following, at a minimum:
 - (1) The frequency and/or schedule of the monitoring of the conditions of approval.
 - (2) A method for monitoring the conditions of approval.
 - (3) A list of reporting procedures, including the responsible party, and frequency.
 - (4) A list of other monitors to be hired, if applicable, and their qualifications.
 - (5) Submittal of biweekly reports during demolition, excavation, grading and footing installation and all other construction activity regarding condition compliance by the CCM to the Community Development Department/Case Planner.
 - (6) Submittal of a Final Condition Compliance Report.
 - (7) The CCM shall have authority over all other monitors/specialists, the contractor, and all construction personnel for those actions that relate to the items listed in the conditions of approval, including the authority to stop work, if necessary, to achieve compliance with conditions affecting the environment.
- b. **Biological Monitor Required**. A biological monitor shall be present when water flows from Arroyo Burro Creek to the ocean in order to the extent necessary to prevent take of endangered or threatened species. The contract for the monitor shall be subject to review and approval by the Planning Division. The biological monitor shall have the authority to halt work if tidewater goby or southern steelhead is found. If said species are found, the biologist shall notify the Environmental Analyst and the Applicant and make a recommendation for avoiding impacts to the species. The Applicant shall only proceed with construction with consent from the Environmental Analyst or other designated Planning staff person.
- c. Letter of Commitment for Pre-Construction Conference. The Owner shall submit to the Planning Division a letter of commitment to hold the

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Pre-Construction Conference identified in condition F.2 "Pre-Construction Conference" prior to disturbing any part of the project site for any reason.

- d. **Design Review Requirements.** Plans shall show all designelements, as approved by the appropriate design review board and all elements/specifications shall be implemented on-site.
- e. Conditions on Plans/Signatures. The final Resolution shall be provided on a full size drawing sheet as part of the drawing sets. Each condition shall have a sheet and/or note reference to verify condition compliance. A statement shall also be placed on the sheet as follows: The undersigned have read and understand the required conditions, and agree to abide by any and all conditions which are their usual and customary responsibility to perform, and which are within their authority to perform.

Signed:

Property Owner		Date
Contractor	Date	License No.
Architect	Date	License No.
Engineer	Date	License No.

- F. Construction Implementation Requirements. All of these construction requirements shall be carried out in the field by the Owner and/or Contractor for the duration of the project construction, including demolition and grading.
 - 1. **Neighborhood Notification Prior to Construction.** At least twenty (20) days prior to commencement of construction, the contractor shall provide written notice to all property owners, businesses, and residents within 300 feet of the project area. The notice shall contain a description of the project, the construction schedule, including days and hours of construction, the name and phone number of the Condition Compliance Monitor (CCM) and Contractors, site rules and Conditions of Approval pertaining to construction activities, and any additional information that will assist Public Works Inspectors, Police Officers and the public in addressing problems that may arise during construction.
 - 2. **Pre-Construction Conference.** Not less than 10 days or more than 20 days prior to commencement of construction, a conference to review site conditions, construction schedule, construction conditions, and condition compliance requirements, shall be held by the General Contractor. The conference shall include representatives from the Public Works Department Engineering and Transportation Divisions, Community Development Department Planning

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Division, the Property Owner, Coastal Engineer, Geologist, Project Engineer, Condition Compliance Monitor, Contractor and each Subcontractor.

- 3. Water Quality and Habitat Protection: Prior to Public Works permit issuance, the applicant shall submit, for the review and approval of the Planning Division, a Construction Best Management Practices Plan for the project site (including the staging area, construction corridor and construction area), prepared by a licensed professional, and shall incorporate erosion, sediment, and chemical control Best Management Practices (BMPs) designed to minimize to the maximum extent practicable the adverse effects associated with construction on receiving waters (creek, storm drain and ocean). The applicant shall implement the approved Construction Best Management Practices Plan on the project site prior to and concurrent with the project staging, demolition and construction operations. This plan shall be coordinated with Santa Barbara County Parks staff. The BMPs shall be maintained throughout the construction process. Said plan shall include the following requirements:
 - a. No demolition or construction materials, debris, or waste shall be placed or stored in a manner where it may be subject to wave, wind, rain, or tidal erosion and dispersion.
 - b. Refuse and debris:
 - 1. Construction and demolition debris and sediment shall be removed from or contained and secured within work areas each day that construction or demolition occurs to prevent the accumulation of sediment and other debris that could be discharged into coastal waters.
 - 2. All trash and debris shall be disposed in the proper trash and recycling receptacles at the end of every construction day.
 - 3. Any and all refuse and debris resulting from construction and demolition activities shall be removed from the project site within 72 hours of completion of demolition and construction.
 - 4. All demolition/construction debris and other waste materials removed from the project site shall be disposed of or recycled in compliance with all local, state, and federal regulations. No debris or other waste materials shall be placed in coastal waters or be allowed to move into coastal waters. If a disposal site is located in the coastal zone, a coastal development permit or an amendment to this permit shall be required before disposal can take place, unless the Planning Division determines it to be unnecessary.
 - c. No storage of mechanized equipment is allowed on the beach.

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- d. Sand from the beach, cobbles, or shoreline rocks shall not be used for construction material.
- e. All excavated beach sand shall be re-deposited on the beach.
- f. Concrete trucks and tools used for construction of the stairs shall not be rinsed at the site.
- g. Sandy beach and habitat areas shall not be used for staging or storage of equipment.
- h. No work shall occur on the beach between Memorial Day weekend and Labor Day of any year to avoid the highest beach use period. No work shall be done on the beach from March 1st to August 31st of any year in order to avoid grunion spawning season. No work shall occur that requires crossing the creek mouth from December 1st through April 30th to avoid higher runoff periods that could affect southern steelhead or tidewater goby.
- i. Machinery or construction materials not essential for project improvements will not be allowed at any time in the intertidal zone.
- j. If turbid conditions are generated during construction, a silt curtain will be used to control turbidity.
- k. Floating booms will be used to contain debris discharged into coastal waters and any debris discharged will be removed as soon as possible but no later than the end of each day.
- 1. Erosion control/sedimentation Best Management Practices (BMPs) shall be used to control dust and sedimentation impacts to coastal waters during construction and demolition activities. BMPs shall include, but are not limited to placement of sand bags around drainage inlets to prevent runoff/sediment transport into the storm drain system, Arroyo Burro Creek, and Pacific Ocean.
- m. All construction materials, excluding lumber, shall be covered and enclosed on all sides, and kept as far away from a storm drain inlet and receiving waters as possible.
- n. No access to the construction site across the mouth of Arroyo Burro Creek shall occur during and for two days following a one-inch or greater rain event shall be allowed.
- o. Machinery shall only cross the mouth of Arroyo Burro Creek when flow and tide are low enough that machinery does not ride through the water, except for wheels or treads.
- p. The contractor will work with the coastal engineer to determine which high tides, if any, will disrupt the construction site and construction shall be prohibited on those days.

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The required Construction Best Management Practices Plan for the project site shall also include the following BMPs designed to prevent spillage and/or runoff of construction and demolition-related materials, sediment, or contaminants associated with construction activity.

- q. Develop and implement spill prevention and control measures to ensure the proper handling, storage, and application of petroleum products and other construction materials. These shall include a designated fueling and vehicle maintenance area with appropriate berms and protection to prevent any spillage of gasoline or related petroleum products or contact with runoff. The fueling and maintenance area shall be located as far away from the receiving waters and storm drain inlets as possible and shall not be located on the beach.
- r. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff. Thinners or solvents shall not be discharged into sanitary or storm sewer systems. Washout from concrete trucks shall be disposed of at a controlled location not subject to runoff into coastal waters, and more than fifty feet away from a storm drain, open ditch, or surface waters.
- s. Provide and maintain adequate disposal facilities for solid waste, including excess concrete, produced during construction.
- t. Provide and maintain temporary sediment basins (including debris basins, desilting basins or silt traps), temporary drains and swales, sand bag barriers, wind barriers such as solid board fence or hay bales, and silt fencing.
- u. Stabilize any stockpiled fill with geofabric covers or other appropriate cover, and close and stabilize open trenches as soon as possible.
- v. The discharge of any hazardous materials into any receiving waters shall be prohibited.
- w. All BMPs shall be maintained in a functional condition throughout the duration of construction activity.
- x. Prior to final inspection of the proposed project, the applicant shall ensure that no gasoline, lubricant, or other petroleum-based product was deposited on the beach or at any beach facility. If such residues are discovered, the residues and all contaminated sand shall be reported to the Planning Division in order to determine if the removal and disposal of the contaminated matter shall require a permit amendment pursuant to the requirements of the Coastal Act and the California Code of Regulations.
- y. The Construction Best Management Practices Plan approved by the Planning Division pursuant to this provision shall be attached to all final construction plans. The permittee shall undertake the approved

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development in accordance with the Construction Best Management Practices Plan approved by the Planning Division pursuant to this provision. Any proposed changes to the approved Construction Best Management Practices Plan shall be reported to the Planning Division in order to determine if the proposed change shall require a permit amendment pursuant to the requirements of the Coastal Act and the California Code of Regulations. No changes to the approved plan shall occur without an amendment to this coastal development permit unless the Planning Division determines that no amendment is legally required.

- 4. Construction Contact Sign. Immediately after Public Works permit issuance, signage shall be posted at the points of entry to the site that list the contractors and Condition Compliance Monitor's (CCM) name, contractors and CCM's telephone numbers, construction work hours, site rules, and construction-related conditions, to assist Public Works Inspectors and Police Officers in the enforcement of the conditions of approval. Said sign shall include a statement that construction may occur outside of normally allowed construction hours if necessary to access the site during low tide, subject to approval by the City Engineer. The font size shall be a minimum of 0.5 inches in height. Said sign shall not exceed six feet in height from the ground if it is free-standing or placed on a fence. It shall not exceed 24 square feet if in a multi-family or commercial zone or six square feet if in a single family zone.
- 5. Construction Hours. Construction (including preparation for construction work) shall only be permitted Monday through Friday between the hours of 7:00 a.m. and 5:00 p.m. and Saturdays between the hours of 9:00 a.m. and 4:00 p.m., excluding the following holidays:

Labor Day Thanksgiving Day Following Thanksgiving Day

1st Monday in September 4th Thursday in November Friday following Thanksgiving Day

*When a holiday falls on a Saturday or Sunday, the preceding Friday or following Monday, respectively, shall be observed as a legal holiday.

When, based on required construction type or other appropriate reasons, such as timing of low tide, it is necessary to do work outside the allowed construction hours, contractor shall contact the Chief of Building and Safety to request a waiver from the above construction hours, using the procedure outlined in Santa Barbara Municipal Code §9.16.015 Construction Work at Night.

6. **Construction Storage/Staging.** Construction vehicle/ equipment/ materials storage and staging shall be done as shown on the approved plans. No parking or storage shall be permitted within the public right-of-way, unless specifically permitted by the Transportation Manager with a Public Works permit.

PLANNING COMMISSION CONDITIONS OF APPROVAL END OF MESA LN (MST2011-00280) SEPTEMBER 8, 2011 PAGE 9 OF 12

- 7. Construction Staging Plan. The contractor shall submit a construction staging plan for review and approval by the Planning Division which indicates that the construction staging area(s) and construction corridor(s) will minimize public access impacts to the public beach and impacts to sensitive habitats. The plan shall demonstrate that:
 - a. Coordination with County Parks staff has occurred and that they have accepted the plans.
 - b. Construction equipment, materials, or activity shall not occur outside the staging area, construction corridor, and construction area identified on the site plan required by this provision.
 - c. Construction equipment, materials, or activity shall not be placed on the sandy beach outside of the immediate construction zone.
 - d. The construction staging area will gradually be reduced as less materials and equipment are necessary.
 - e. The construction access route will only be intermittently closed for transport of equipment and materials. When not in use for transportation of equipment and materials, it will be made available for undisrupted public access.
 - f. The site plan shall include, at a minimum, the following components:
 - (1) limits of the staging area(s);
 - (2) construction corridor(s);
 - (3) construction site;
 - (4) location of construction fencing and temporary job trailers with respect to the existing parking lot, day use area and the sandy beach.
 - g. If fill is necessary to improve access to the beach west of the restaurant, it shall be clean fill and shall be removed when construction is complete.
 - h. The contractor shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Planning Division for consideration and possible approval.
- 8. **Construction Parking.** During construction, free parking spaces for construction workers shall be provided on-site or off-site in a location subject to the approval of the Transportation Manager.
- 9. **Stair Closure.** The Parks and Recreation Department will submit a closure plan, including fencing and signage, prior to issuance of the Public Works permit. All public access to the stairs will be prohibited for the duration of construction. A sign shall be placed at the top of the stairs that states:

PLANNING COMMISSION CONDITIONS OF APPROVAL END OF MESA LN (MST2011-00280) SEPTEMBER 8, 2011 PAGE 10 OF 12

Mesa Lane Stairs is closed for repair from September *, 20** (day after Labor Day)through November 30, 20**. Alternative coastal access is available at Arroyo Burro (Hendry's) Beach to the west and Shoreline Park and Ledbetter Beach Park to the east. Parking is available at all three locations. Please contact the City of Santa Barbara Parks and Recreation Department if you have any questions at (805) 564-5418.

The sign will also include a map showing the alternate access locations.

- 10. **Condition Compliance Reports.** The CCM shall submit biweekly reports during demolition, excavation, grading, footing installation, and all other construction activity regarding condition compliance to the Community Development Department Planning Division.
- 11. Unanticipated Archaeological Resources Contractor Notification. discovery measures shall be implemented per the City master Environmental Assessment throughout grading and construction: Prior to the start of any vegetation or paving removal, demolition, trenching or grading, contractors and construction personnel shall be alerted to the possibility of uncovering unanticipated subsurface archaeological features or artifacts. If such archaeological resources are encountered or suspected, work shall be halted immediately, the City Environmental Analyst shall be notified and the Owner shall retain an archaeologist from the most current City Qualified Archaeologists List. The latter shall be employed to assess the nature, extent and significance of any discoveries and to develop appropriate management recommendations for archaeological resource treatment, which may include, but are not limited to, redirection of grading and/or excavation activities, consultation and/or monitoring with a Barbareño Chumash representative from the most current City qualified Barbareño Chumash Site Monitors List, etc.

If the discovery consists of possible human remains, the Santa Barbara County Coroner shall be contacted immediately. If the Coroner determines that the remains are Native American, the Coroner shall contact the California Native American Heritage Commission. A Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Environmental Analyst grants authorization.

If the discovery consists of possible prehistoric or Native American artifacts or materials, a Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Environmental Analyst grants authorization.

A final report on the results of the archaeological monitoring shall be submitted by the City-approved archaeologist to the Environmental Analyst within 180 days of PLANNING COMMISSION CONDITIONS OF APPROVAL END OF MESA LN (MST2011-00280) SEPTEMBER 8, 2011 PAGE 11 OF 12

completion of the monitoring and prior to any certificate of occupancy for the project.

- G. **Prior to Final Inspection.** Prior to Final Inspection, the Owner of the Real Property shall complete the following:
 - 1. **Repair Damaged Public Improvements.** Repair any public improvements (curbs, gutters, sidewalks, roadways, etc.) or property damaged by construction subject to the review and approval of the Public Works Department per SBMC §22.60.090. Where tree roots are the cause of the damage, the roots shall be pruned under the direction of a qualified arborist.
 - 2. Condition Compliance Report. Submit a final construction report for construction compliance.

H. General Conditions.

1. Compliance with Requirements. All requirements of the city of Santa Barbara and any other applicable requirements of any law or agency of the State and/or any government entity or District shall be met. This includes, but is not limited to, the Endangered Species Act of 1973 [ESA] and any amendments thereto (16 U.S.C. § 1531 et seq.), the 1979 Air Quality Attainment Plan, and the California Code of Regulations.

2. Approval Limitations.

- a. The conditions of this approval supersede all conflicting notations, specifications, dimensions, and the like which may be shown on submitted plans. This approval shall be valid for five (5) years from the date of Planning Commission approval.
- b. All buildings, roadways, parking areas and other features shall be located substantially as shown on the plans approved by the Planning Commission.
- c. Any deviations from the project description, approved plans or conditions must be reviewed and approved by the City, in accordance with the Planning Commission Guidelines. Deviations may require changes to the permit and/or further environmental review. Deviations without the above-described approval will constitute a violation of permit approval.

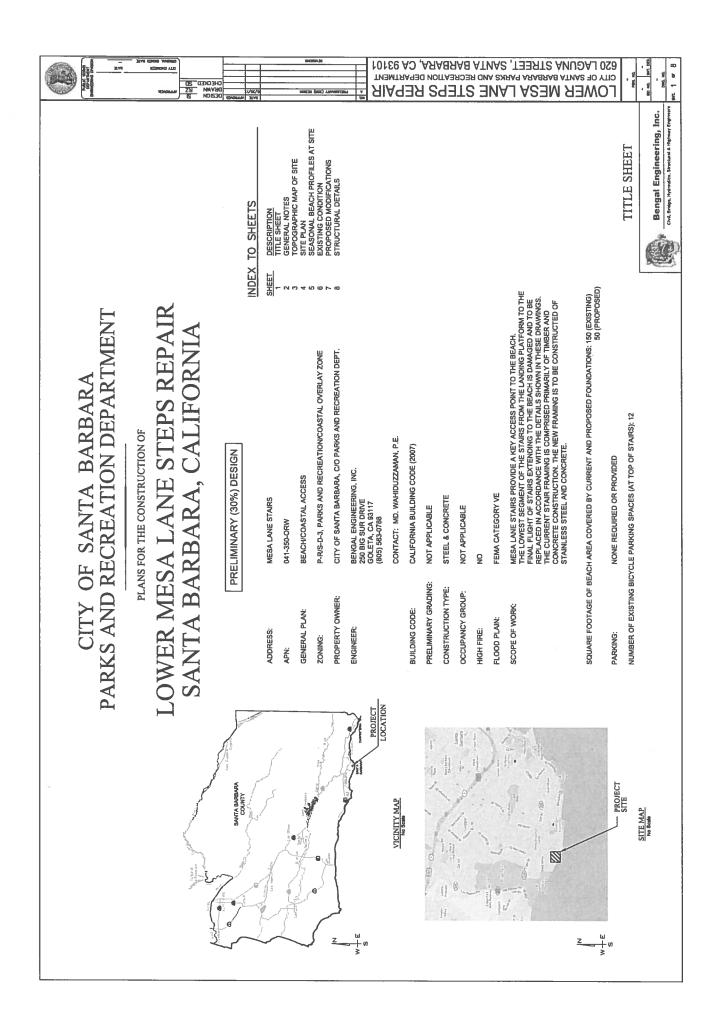
NOTICE OF COASTAL DEVELOPMENT PERMIT TIME LIMITS:

The Planning Commission action approving the Coastal Development Permit shall expire two (2) years from the date of final action upon the application, per Santa Barbara Municipal Code §28.44.230, unless:

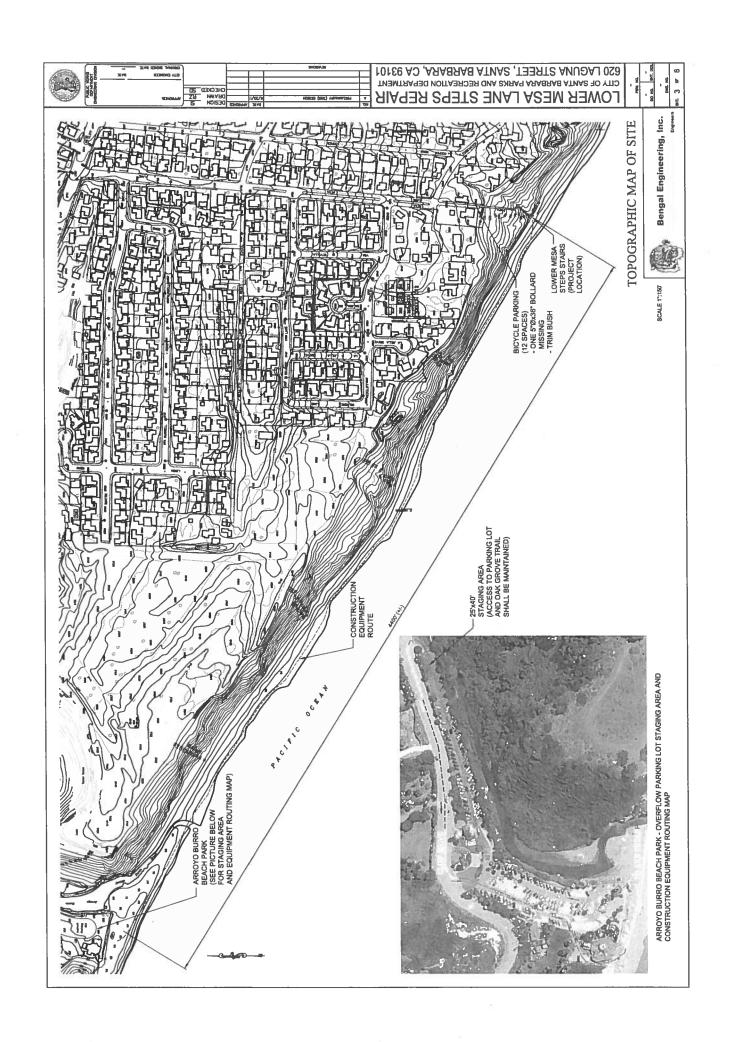
1. Otherwise explicitly modified by conditions of approval for the coastal development permit.

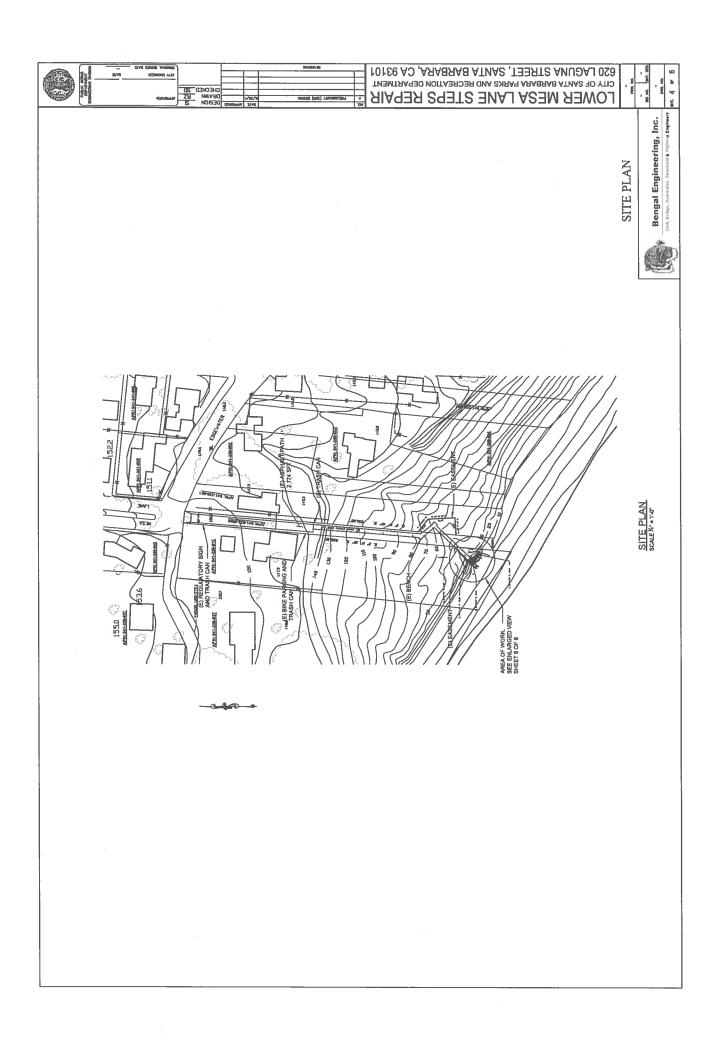
PLANNING COMMISSION CONDITIONS OF APPROVAL END OF MESA LN (MST2011-00280) SEPTEMBER 8, 2011 PAGE 12 OF 12

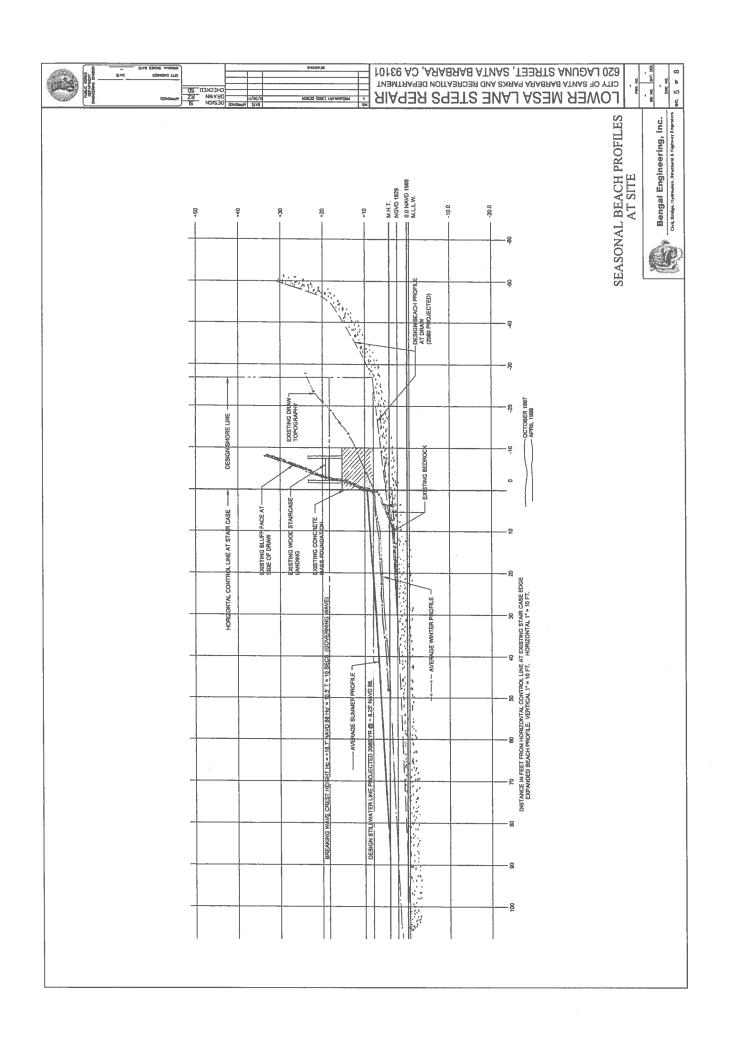
- 2. A Public Works permit for the work authorized by the coastal development permit is issued prior to the expiration date of the approval.
- 3. The Community Development Director grants an extension of the coastal development permit approval. The Community Development Director may grant up to three (3) one-year extensions of the coastal development permit approval. Each extension may be granted upon the Director finding that: (i) the development continues to conform to the Local Coastal Program, (ii) the applicant has demonstrated due diligence in completing the development, and (iii) there are no changed circumstances that affect the consistency of the development with the General Plan or any other applicable ordinances, resolutions, or other laws.

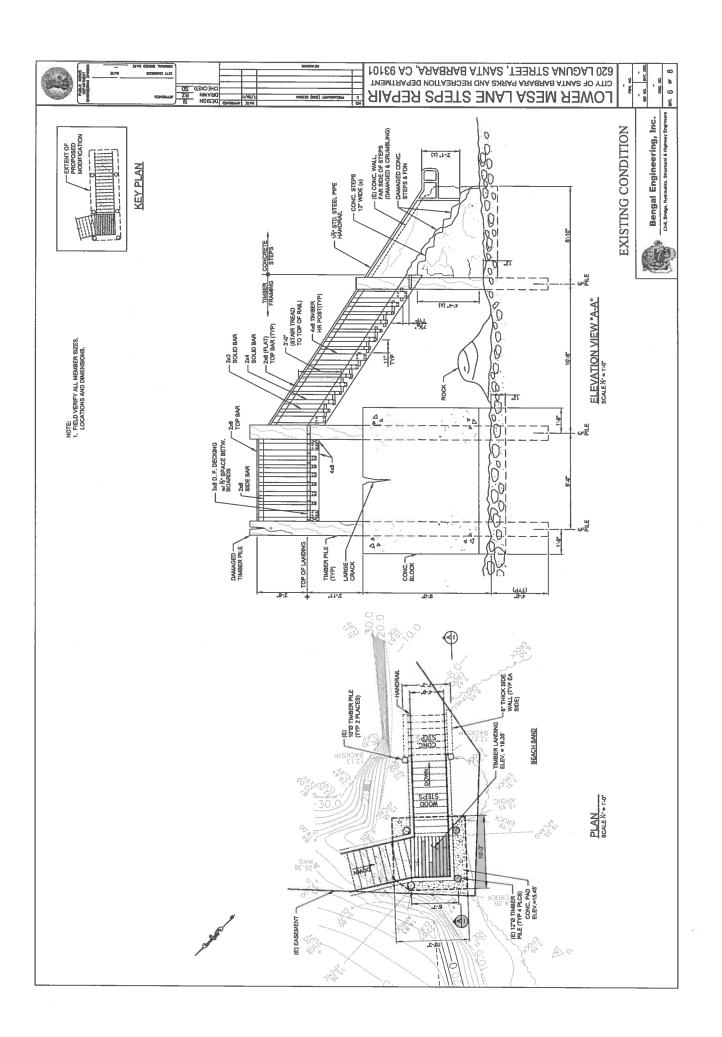


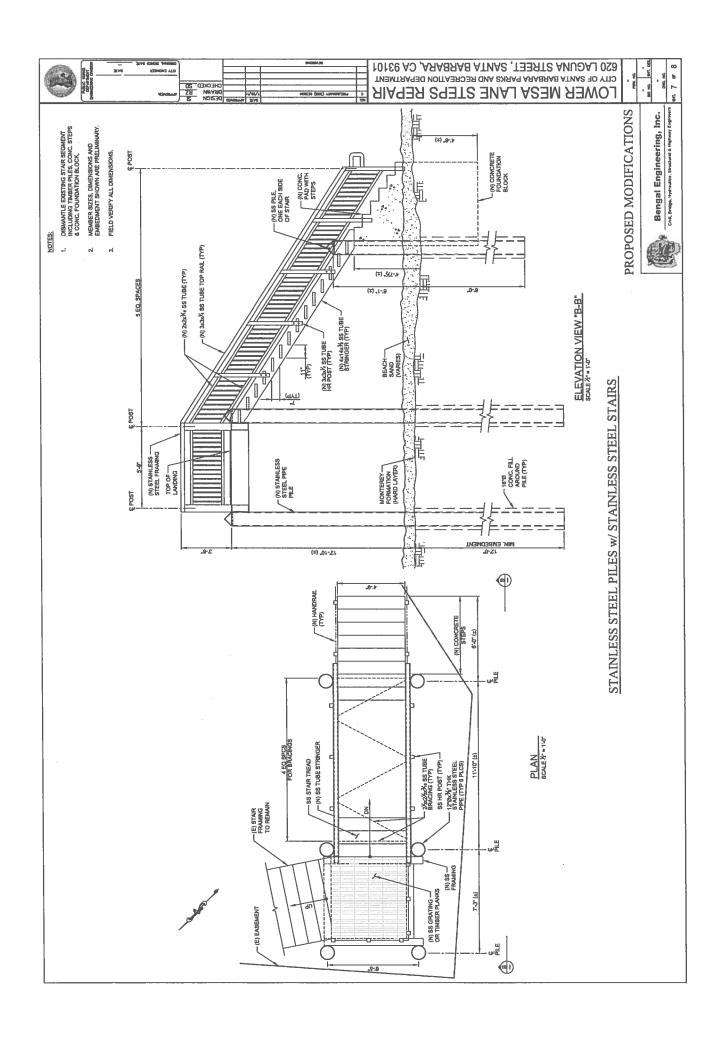
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	T.O.B. TOP OF BEAM TEMPORARY		TOP TOP OF PIPE		TYP TYPICAL		UNO UNE RORES NOTED OTHERWISE		VERT VERTICAL VP			WO WITHOUT	WR WATER-RESISTANT		WI WEIGHT		CTTOIN INCOME IN CLICKLY	STRUCTURAL GENERAL NOTES	GENERAL:	 ALL DESKON WORK UNDER THIS CONTRACT SHALL COMPLY WITH THE 2007 EDITION OF CALIFORNIA BUILDING CODE (CBC). 	2. THE CONTRACTOR SHALL VERIFY ALL EXISTING MEMBER OFFICE PRINCIPLE OF EXALTINGS AND STE COMMITTIONS	BEFORE BTARTING WORK AND SHALL NOTIFY THE ENGINEER	IMMEDIATELY OF ANY DISCREPANCES, CARSSIONS, AMBICUITIES AND COMPLICT RETAKEN VARIOUS FLEMENTS	OF THE DESIGN DRAWINGS AND FIELD CONDITION.	3. MATERIAL AND PAYMENTS SHALL BE IN ACCORDANCE WITH	SPECIFICATIONS.	4. SHICASE OF CONFLICT BETWEEN SPECIFICATION AND DRAWMIN SUPPRIATION SHOWN ON DRAWMIN SHALL	PREVAIL.	5. DIMENSONS SHALL NOT BE SCALED OFF THE DRAWINGS. A MOTTER AND DETAILS ON BURNINGS IN DRAWINGS SHALL TAKE	PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.	IN CASE OF COMPLICT. 7. THE STRUCTURE IS DESIGNED AS A STABLE UNIT AFTER ALL	No.	REQUIRED TO ENSURE THE VERTICAL AND LATERAL	STABILITY OF THE ENTIRE STRUCTURE OR ANY PORTION THEREOF IN IRMO CONSTRUCTION	8. THE CONTRACTOR SHALL DESIGN, CONSTRUCT AND	SCAFFOLDING AND BRACING, AND SHALL BE SOLELY	RESPONSBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS. LAWS AND	REGULATIONS, NETHER THE OWNER NOR THE ENGINEER	9. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE	COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING	THE SAFETY OF ALL PERSONS AND PROPERTY, THIS DECUMENDATION IN THE SAFETY OF THE CONTINUOUS Y AND IS NOT I MATERIAL.	TO THE NORMAL WORKING HOURS.	ENGREER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR	WITH ALL ITEMS THAT THE SUBSTITUTION MAY AFFECT.	11, PEES AND COSTS ASSOCIATED WITH REDESIGN OR MODIFICATIONS OF THESE PLANS BY THE ENGINEER AS A	RESULT OF DEVATION BY THE CONTRACTOR FROM THE PLANS AND SPECIFICATIONS OR DUE TO ERROR, FAULTY	MATERIALS OR FAULTY WORGANISHER ARE THE RESPONSIBLITY OF THE CONTRACTOR	12. THE ENGINEER MAY PROVIDE ONLY PERIODIC OBSERVATION	OF THE WORK. 13. NEITHER PROFESSIONAL ACTIVITIES NOR PRESENCE OF	THE ENGINEER AT THE CONSTRUCTION SITE RELIEVES THE CONTRACTOR OF HIS OBLIGATION, DUTIES AND	RESPONSIBILITIES FOR CONSTRUCTION MEANS, METHODS, SEQUENCES AND PROCEDURES NECESSARY FOR THE	CONTRACTOR TO COMPLETE THE WORK IN ACCORDANCE MOTH THE DI AND SPECIEICATIONS	14. BIDDERS MUST VISIT THE SITE AND FAMILIARIZE	DISCRESSIVE THE ENGINEER CONTINUES.	THE OWNER AND ENGINEER REFORE THE BID DATE.	301.; 1. NO SOIL INVESTIGATION WAS PERFORMED FOR THE	CURRENT REPAIR WORK.			
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ABBREVIATIONS	ASPHALTIC CONCRETE AMERICAN CONCRETE INSTITUTE	ADJUSTABLE / ADJUST	ALUMINUM ALUMINUM	ANCHOR	TESTING AND MATERIALS	AMERICAN WOOD PRESERVERS	ASSOCIATION AMERICAN WELDING SOCIETY	AMERICAN WATER WORKS	ASSOCIATION	BEGIN OF CURVE	BUILDING	BLOW OFF	BASE PLATE		CAPACITY	CALIFORNIA BUILDING CODE	CUBIC FEET PER MINUTE	CAST BON	CONTROL JOINT	CENTERLINE, CALUMNE	CEMENT MORTAR COATING	CEMENT MORTAR LINANG CORRUGATED METAL PRPE	CONCRETE MASONRY UNIT	COLUMN	COMMONICATION	CONTINUOUS	COPPER	CALCALOR PROPERTIES	DEPTH	DAMETER Described and Taus Desare	DETAIL.	DHMENSION	DOWN DIMENSION FATIO	DOWNSTREAM	DRAWING	EXHAUST AIR, EACH	END OF CURVE		ELECTRIC, ELECTRICAL		EACH WAY	EXCAVATION	EXCSTRAG	28-DAY CONCRETE CYLINDER STRENGTH	FIRSH ELEVATION, PLOUR	FACE OF PINISH	FWISHED GRADE	HOTAL	FLANGED FIBERGLASS REINFORCED PLASTIC	FOOT OR FEET	CAUGE	GALVANIZED	GALLONS PER HOUR	GALLONS PER MINITE				HORSEPOWER		
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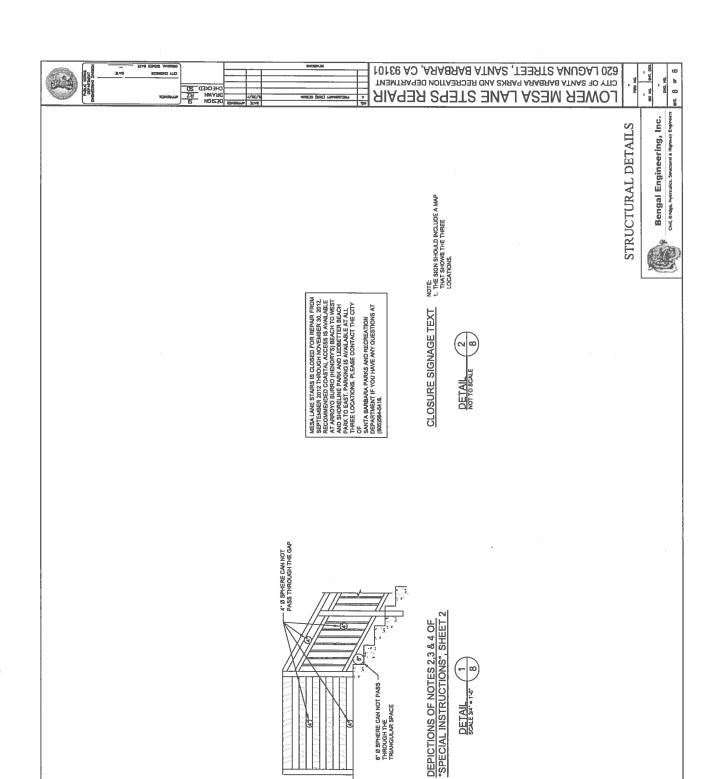












6" Ø SPHERE CAN NOT PASS THROUGH THE TRIANGULAR SPACE



City of Santa Barbara

Parks and Recreation Department

www.sbparksandrecreation.com

www.ci.santa-barbara.ca.us

Administration

June 30, 2011

Tel: 805.564.5431

Fax: 805.564.5480

Planning Commission City of Santa Barbara

Parks Division Office

P.O. Box 1990

Tel: 805.564.5433 Fax: 805.897.2524

Santa Barbara, CA 93102-1990

PLANNING DIVISION

Recreation Division

Tel: 805.564.5418

Office

Fax: 805.564.5480

RE:

MESA LANE STAIRS REPAIR/RECONSTRUCTION, APPLICATION FOR

COASTAL DEVELOPMENT PERMIT

Dear Planning Commissioners:

Creeks Division Office Tel: 805.897.2658 Fax: 805.897.2626

620 Laguna St. PO Box 1990 Santa Barbara, CA 93102-1990

Golf Course Tel: 805.564.5547 Fax: 805.897.2644 3500 McCaw Ave

PO Box 1990 Santa Barbara, CA

93102-1990

Community Services Tel: 805.963.7567 Fax: 805.963.7569 423 W. Victoria St. PO Box 1990 Santa Barbara, CA 93102-1990

The City Parks and Recreation Department is seeking approval of a Coastal Development Permit (CDP) to replace a portion of the Mesa Lane Stairs and its foundation on the beach that are damaged due to wear and tear from the beach tidal environment. As discussed in more detail below, the stairs have existed since 1982 and are an important beach access for Mesa residents. The nearest beach access points are at Arroyo Burro Beach County Park over 4200 feet to the west and Camino Al Mar (1000 Steps) about one miles to the east of Mesa Lane. Beach access is also available at Shoreline Park, 1.5 miles to the east. The Mesa Lane Stairs are heavily used by residents of the West Mesa and Alta Mesa neighborhoods, including children, dog walkers, surfers, families, and others. They are also well used by other South Coast residents. A particularly well-used round trip walk goes down the stairs, west along the beach, through Arroyo Burro County Beach Park, up the Oak Grove Trail in the Douglas Family Preserve, through the Preserve and back to Mesa Lane.

Both the landing foundation and the concrete stairs are cracked and eroding, most likely due to the type of rebar used in the construction and the impact of sea water. This rebar is not wrapped with epoxy or other material, which substantially increases the amount of rust. When rebar rusts, it expands and cracks the surrounding concrete. Sea water and moist salty air enters the cracks, causes more corrosion in the rebar, worsening the cracks, and the cycle continues until the concrete crumbles. Also, the concrete mix used to construct these project elements was not the ideal mix for a coastal environment that is often exposed directly to ocean water, which further increases erosion. Additionally, the exposed rebar in the stairs could present a potential trip hazard. The existing connectors between stairs and stairway, stairs and landings, etc. are all standard galvanized hinges, brackets and bolts that have rusted in the salt air. Photos of the stairs and immediate area are included in Exhibit 1.

Even though the economy and city budget are tight, both the Parks and Recreation Commission and the City Council agree that this is a high priority project and has included funding for staff time, design, and project approval in the city budget. Approval by the Planning Commission is required before city staff can pursue grants to fund the actual construction costs, which are expected to be about \$600,000. An additional benefit is that the structure's beach footprint will decrease by about two-thirds when compared to the current footprint. Coastal Act policies and

Planning Commission.
CDP for Mesa Lane Stairs Repair
June 30, 2011
Page 2 of 5

Coastal Commission regulations strongly support reducing beach structures, which can adversely affect wave run-up and erosion.

BACKGROUND:

A trail has existed at the end of Mesa Lane for many decades. It was originally a simple foot trail with crude wooden steps. It was treacherous for most of its length, especially near the bottom when wet. The Local Coastal Plan, adopted in 1981, included a detailed discussion of the trail and included policies that supported the construction of a stairway to provide safe access between the Mesa and the beach (see Exhibit 2 for the discussion and relevant policies).

The Mesa Lane Stairs were originally constructed over the existing trail down the cliff at the end of Mesa Lane in 1982. The State Coastal Commission issued the Coastal Development Permit in late 1980 since the City's LCP had not yet been adopted. The project was determined to be categorically exempt from the California Environmental Policy Act (CEQA). Construction of the project was funded by a Coastal Energy Impact Fund grant issued through the California Coastal Conservancy.

In 1991, the foundation of the stairs at the beach was repaired and the foundation footprint expanded. In 2002, the city replaced the guardrail to make it compliant with the Building Code and added an accessible handrail to the stairs. City staff issued Coastal Exclusions for both projects and Staff determined the projects to be Categorically Exempt from CEQA.

GENERAL PLAN AND ZONING;

General Plan Designation: Beach/Coastal Access Zoning: E-3/S-D-3, Single-Family Residential/Coastal Overlay (note that Tidemark says Zoning is P-R, Park and Recreation, while Zoning Map shows E-3)

PROJECT DESCRIPTION:

The Parks and Recreation Department proposes to remove the last flight of stairs (of 13 flights) and landing, and remove the concrete stairs and foundation. The last flight of stairs will then be reconstructed using deeper stainless steel piles at the upper landing, a concrete foundation and shorter, but deeper, stainless steel piles at the bottom landing and stainless steel stairs and guard/hand rails. Additionally, two large eucalyptus tree trunks will be removed at a location about 300 feet to the west if needed to allow equipment to access the site. A summary description is included below. A more complete description is attached as Exhibit 3. Project plans are attached as Exhibit 4.

The stairs are designed to meet criteria established by the California Coastal Commission (CCC) related to projected sea rise and durability. The CCC requires that a beach structure be designed to last a minimum of 50 years. It should also be designed to withstand a 50-year storm event. Finally, it must be designed to meet expected sea rise over a 50-year period. City staff communicated with CCC staff to confirm our approach to project design. In order to determine storm surge and sea rise at this location, it was necessary to prepare a Coastal Engineering

Planning Commissio... CDP for Mesa Lane Stairs Repair June 30, 2011 Page 3 of 5

Report. This report was prepared by Pacific Engineering Group (Exhibit 5). All design requirements outlined in the report have been incorporated into the project design.

Existing: The existing concrete landing foundation is 10 feet 3 inches long x 10 feet 3 inches wide x 12 feet 8 inches tall (about 10 feet exposed), with a 105 sq. ft. footprint. The four existing timbers that support the landing are about 24 feet tall, of which about 4 feet are in bedrock. The concrete stairs are 7 feet long x 7 feet wide x 5 feet tall (at the top), with a footprint of about 56 sq. ft. The two timber piles that support the lower end of the stairs are about 14 feet tall, of which four feet are in bedrock. Both concrete forms are dug into bedrock only about 6 to 12 inches and there is evidence of erosion at the base.

Proposed Project: The existing stairs and support structures would be replaced with new stainless steel stairs and handrails, supported by 12" diameter stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The existing concrete stairs would be replaced with new concrete stairs that would be founded about 4.5 feet into bedrock. The lower part of the stainless steel stairs would be supported by 12" stainless steel piles in holes drilled into bedrock and grouted in place with concrete. The concrete would be a specific mix that is less subject to erosion by sea water and the rebar would be covered in a special epoxy to minimize rust. The total footprint at beach level would be about 50 sq. ft. Depending on funding, construction should occur in 2012 or 2013.

Construction:

Mesa Lane Stairs Closure: Prior to demolition, the City will close the stairs to the public for the duration of demolition and construction. The closure is expected to last about three months, starting the Tuesday following Labor Day and finishing no later December 1st of the year construction occurs. Depending on funding, construction should occur in 2012 or 2013.

<u>Demolition</u>: All of the concrete landing and stairs, existing timbers, landing staircase and guard and handrails will be removed. The flight of stairs immediately above the stairs to be replaced will be supported and braced during construction. Demolition materials will be hauled out along the beach westward to Arroyo Burro Beach County Park and appropriately disposed of or recycled. Demolition will take about 5 working days.

Construction Staging/Storage: All materials and equipment required for construction will be stored at Arroyo Burro Beach County Park. Materials will be stored near the northeasterly end of the overflow parking area in a space about 25 feet by 40 feet. The space is located to avoid two specimen coral trees at the northeasterly end. The location also avoids impacts on access to the Douglas Family Preserve via the Oak Hill Trail and for vehicles exiting the parking area. The staging/storage area will include means to prevent any fuel and similar spills from draining into Arroyo Burro Creek.

Construction Access: Access for construction will be from the Staging/Storage area around the westerly side of the restaurant onto the beach, across the mouth of Arroyo Burro Creek and easterly along the beach to the construction site. Access will only occur when tides are low enough to avoid taking construction vehicles and equipment through ocean water to get to the construction site on the beach. A Water Quality and Habitat Protection Plan will be in place to

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minimize any potential effects on the mouth of Arroyo Burro Creek and species using the creek (See Detailed Project Description, Exhibit 3).

<u>Construction Workers and Equipment</u>: A maximum of 13 construction workers are expected to be onsite during construction. See chart in detailed project description for more information on workers and equipment. Please understand that this may change, depending upon the contractor hired to carry out the project.

Basic Project Submittal Questions:

- 1. The project does not include any new or existing exterior lighting.
- 2. The project does not involve the creation of smoke or odors.
- 3. The project does not result in the creation of new noise sources, except during construction. Since all construction will occur at the base of the bluff, there will be no noise impacts on residents near the Mesa Lane Stairs. The base of the bluff is about 140 feet below the closest homes.
- 4. A Coastal Engineering Report and a Geotechnical memo have been prepared for the project and are included in the submittal package (Exhibits 5 and 6). Recommendations about design, concrete formulas, and other project components have been incorporated into the project design. A final geotechnical report will be prepared prior to construction that will determine the final depth of all piles. At this point, piles are proposed to be drilled up to 12 feet into the bedrock. However, it is likely that the depth will be somewhat less.
- 5. An archaeological report was submitted for the original project. No archaeological remains were identified and monitoring was not required during project construction.
 - In order to allay concerns regarding potential impacts on the Tidewater Goby at Arroyo Burro Creek mouth, we contacted Rosie Thompson, an experienced biologist with Cardno Entrix, who is doing follow-up monitoring for the Arroyo Burro Estuary Restoration Project completed in December 2006. Ms. Thompson confirmed that the goby does not stay near the mouth of the creek as a result of recent goby monitoring. The goby prefer the upper end of the lagoon, near the bridge at Cliff Drive. As long as the creek is not in high flow, there should be no problems crossing the mouth of the creek, even when it is flowing, as long as standard construction precautions are carried out. These are included in the Project Description. Additionally, the Southern steelhead requires flows at least seven inches deep to move into the creek from the ocean. IT should be noted that there is no recent history of Southern steelhead entering Arroyo Burro Creek and there is no evidence of them in the upper watershed. By restricting construction outside of the rainy season and at any time there is a rain event of more than one-inch, it is very unlikely that there will be any problems.
- 6. The project is a designated recreational trail and is being repaired so that use can continue. The construction staging/storage area is located near the exit for the Arroyo Burro Beach overflow parking lot. This is near a trailhead for the Oak Hill Trail in the Douglas Family Preserve. There are two other access points from Cliff Drive that will not be affected at all by the staging area.

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- 7. The project construction/staging area is located near Arroyo Burro Creek and construction access will cross the mouth of the creek. See Project Description for information on measures included to minimize risk to the creek and the beach.
- 8. All the Cortese Hazardous Waste lists and the abandoned oil well map have been reviewed and no sites have been found in the project construction or staging areas. Please see signed statement (Exhibit 7).

Concept and Other Reviews:

The Architectural Board of Review will hold a Concept Review hearing on the project in July 2011. The Parks and Recreation Commission will discuss the project at its regular July 27, 2011 meeting as part of a Capital Program project discussion.

Parks and Recreation staff have worked closely with Planning staff to develop a complete project description and application. We believe that, as the project description has been detailed, the project is eligible for a Categorical Exemption from the California Environmental Quality Act (CEQA), under Section 15302 – Replacement or Reconstruction which applies when a structure is replaced (in whole or in part) on the same site and has the same purpose and capacity of the prior structure.

In conclusion, we believe that this project brings major benefits by extending the life of the stairs. It will also reduce the beach footprint, enhancing natural processes.

Please feel free to email Jan Hubbell if you have any questions at jhubbell@santabarbaraca.gov

Sincerely

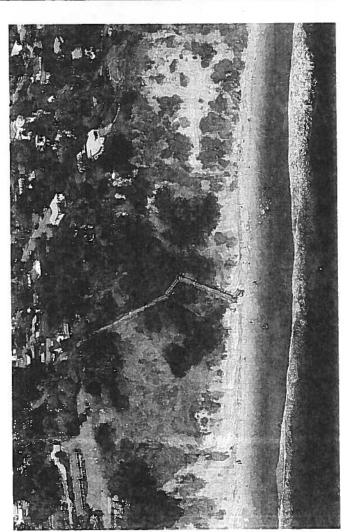
Assistant Parks and Recreation Director

Exhibits:

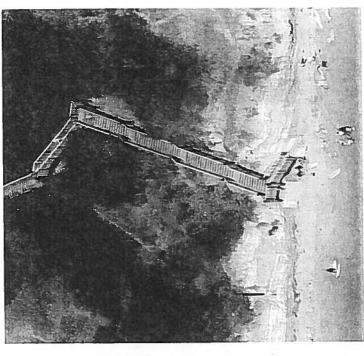
- 1. Mesa Lane Stairs Photos
- 2. Local Coastal Plan discussion of Mesa Lane Trail.
- 3. Detailed Project Description
- 4. Project Plans
- 5. Coastal Engineering Report, prepared by Pacific Engineering Group, March 23, 2011
- 6. Geotechnical Memorandum, prepared by Bengal Engineering, March 10, 2011
- 7. Hazardous Waste Statement

Cc: Jan Hubbell, Project Manager, Parks and Recreation Department

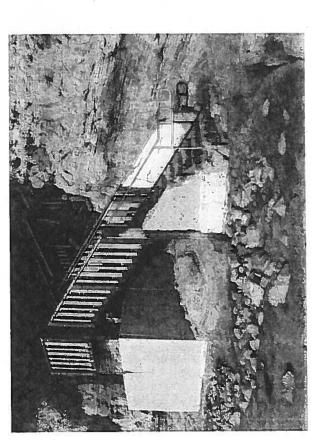
Exhibit 1 - Mesa Lane Steps Photos



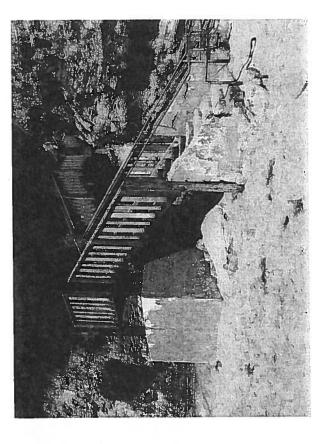
1. Mesa Lane Steps from California Coastal Records Project Photo 200404814, taken September 23, 2002



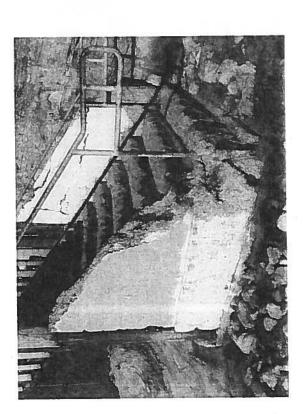
2. Close-up of lower portion of Mesa Lane Steps from same photo, taken September 23, 2002



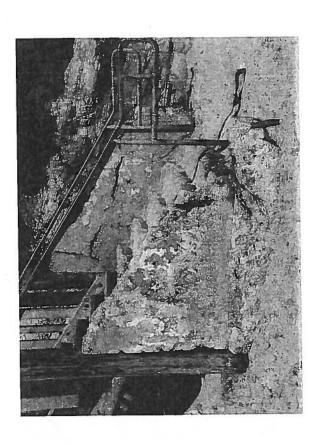
3. Mesa Lane Steps –full project area, taken by City staff, November 5, 2009 (please note that considerable sand has already washed away from base of concrete foundation and stairs)



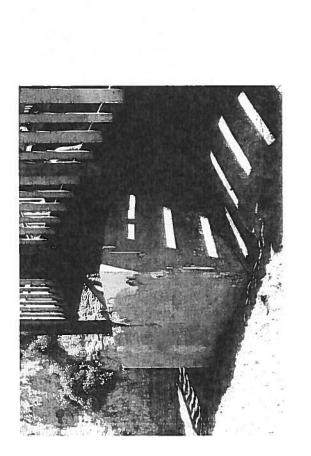
4. Mesa Lane Steps – full project area, taken by City staff, September 14, 2010 (please note that summer sand is still in place)

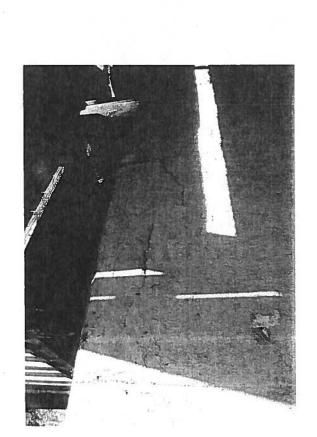


5. Mesa Lane Steps Lower Detail, taken by City staff, January 16, 2009 (please note that considerable sand has already washed away from base of concrete foundation and stairs)



6. Mesa Lane Steps Lower Detail, taken by City staff, September 14, 2010 (please note that summer sand is still in place)







7. Upper left – Foundation for lowest landing, taken by City staff, August 24, 2010
8. Upper right – Example of damaged brace, taken by City staff, August 24, 2010
9. Lower left – Close up of cracks in easterly side of foundation (note both vertical and horizontal cracks), taken by City staff, August 24, 2010

MESA LANE STAIRS REPAIR DETAILED PROJECT DESCRIPTION

This is a detailed project description, including components designed to minimize project effects on the environment. These components are all related to construction. The replaced stairs will significantly reduce the project imprint on the beach and result in more natural wave run-up.

Proposed Project: The purpose of the project is to replace the last flight of stairs and landing with new stainless steel stairs, guardrails, and handrails, supported at the upper landing by 12" diameter, 24'8" tall stainless steel piles in holes drilled into bedrock and grouted in place with concrete (12'10" of the piles will be visible). The lower end of the stainless steel stairs will be supported on concrete steps and two 12" diameter, 12'1" stainless steel piles in holes drilled into bedrock and grouted in place with concrete (6'1" of the piles will be visible). The existing concrete stairs at the base will be replaced with new concrete stairs that be supported on monolithic foundation embedded about 4.5 feet into bedrock. The concrete will be a specific mix that is less subject to erosion by sea water and the rebar will be covered in a special epoxy to minimize rust. The landing footprint (four 12-inch diameter stainless steel piles) at beach level will be 3.14 sq. ft. The concrete stairs footprint will be about 6 feet long by 4.75 feet wide with a footprint of 28.5 sq. ft. The two stainless steel piles supporting the stairs at the base will be about 6 feet tall and have a footprint of 1.6 sq. ft. The total footprint at beach level will be about 50 sq. ft. The footprint at the beach will be reduced by two-thirds with the proposed project.

The stairs will need to be closed during construction, which will last no more than three months. Parks and Recreation staff met with Santa Barbara County Parks staff to request access and staging from Arroyo Burro Beach County Park. It was agreed to avoid any construction in the summer to minimize effects on park and beach users. County Parks staff will also provide five parking spaces in the overflow parking area for the duration of construction. Access through the parking lot for vehicles will be maintained, as will access to Douglas Family Preserve via a parking lot trailhead. Most, if not all, equipment will be able to use the existing ramp to the west of the Boathouse Restaurant to access the beach and construction site. There is the potential for one piece of equipment to go over the rocks on the easterly side. However, it can "walk" over the rocks so no special ramps or park furniture relocation will be required. In order to access the site, it may be necessary to remove two dead eucalyptus trees that are about 300 feet to the west of the stairs.

Existing: The existing concrete landing foundation is 10.25 feet long x 10.25 feet wide x 12 feet 8 inches tall (about 10 feet exposed), with a 105 sq. ft. footprint. The four existing timbers that support the landing are about 24 feet tall, of which about 4 feet are in bedrock. The concrete stairs are about 7 feet long x 7 feet wide x 5 feet tall (at the top), with a footprint of about 50 sq. ft. The two timbers that support the lower end of the stairs are about 17 feet tall, of which four feet are in bedrock. Both concrete forms are dug into bedrock only about 6 to 12 inches. The existing footprint is about 150 sq. ft.

DEMOLITION AND CONSTRUCTION:

Prior to construction, it will be necessary to complete and implement a Water Quality and Habitat Protection Plan, as follows:

I. Water Quality and Habitat Protection: Prior to building permit issuance, the applicant shall submit, for the review and approval of the Planning Division, a Construction Best Management Practices Plan for the project site (including the staging area, construction corridor and construction area), prepared by a licensed professional, and shall incorporate erosion, sediment, and chemical control Best Management Practices (BMPs) designed to minimize to the maximum extent practicable

City of Santa Barbara Parks an Accreation Department Mesa Lane Stairs Detailed Project Description June 30, 2011 Page 2 of 6

the adverse effects associated with construction on receiving waters (creek, storm drain and ocean). The applicant shall implement the approved Construction Best Management Practices Plan on the project site prior to and concurrent with the project staging, demolition and construction operations. This plan shall be coordinated with Santa Barbara County Parks staff. The BMPs shall be maintained throughout the construction process.

- A. Said plan shall include the following requirements:
 - 1. No demolition or construction materials, debris, or waste shall be placed or stored in a manner where it may be subject to wave, wind, rain, or tidal erosion and dispersion.
 - 2. Refuse and debris:
 - a. Any and all refuse and debris resulting from construction and demolition activities shall be removed from the project site within 72 hours of completion of demolition and construction.
 - b. Construction and demolition debris and sediment shall be removed from or contained and secured within work areas each day that construction or demolition occurs to prevent the accumulation of sediment and other debris that could be discharged into coastal waters.
 - c. All demolition/construction debris and other waste materials removed from the project site shall be disposed of or recycled in compliance with all local, state, and federal regulations. No debris or other waste materials shall be placed in coastal waters or be allowed to move into coastal waters. If a disposal site is located in the coastal zone, a coastal development permit or an amendment to this permit shall be required before disposal can take place, unless the Planning Division determines it to be unnecessary.
 - 3. No storage of mechanized equipment is allowed on the beach.
 - 4. Erosion control/sedimentation Best Management Practices (BMPs) shall be used to control dust and sedimentation impacts to coastal waters during construction and demolition activities. BMPs shall include, but are not limited to placement of sand bags around drainage inlets to prevent runoff/sediment transport into the storm drain system, Arroyo Burro Creek, and Pacific Ocean.
 - 5. All construction materials, excluding lumber, shall be covered and enclosed on all sides, and kept as far away from a storm drain inlet and receiving waters as possible.
 - 6. No access to the construction site across the mouth of Arroyo Burro Creek shall occur during and for two days following a one-inch or greater rain event shall be allowed.
 - 7. No work shall be done on the beach from March 1st to August 31st of any year in order to avoid grunion season.
 - 8. A biological monitor shall be present when water flows from Arroyo Burro Creek to the ocean in order to the extent necessary to prevent take of endangered or threatened species.
- B. The required Construction Best Management Practices Plan for the project site shall also include the following BMPs designed to prevent spillage and/or runoff of construction and demolition-related materials, sediment, or contaminants associated with construction activity. The applicant shall:
 - 1. Develop and implement spill prevention and control measures and shall ensure the proper handling, storage, and application of petroleum products and other construction materials. These shall include a designated fueling and vehicle maintenance area with appropriate berms and protection to prevent any spillage of gasoline or related petroleum products or contact with runoff. The fueling and maintenance area shall be located as far away from the receiving waters and storm drain inlets as possible and shall not be located on the beach.

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- 2. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff. Thinners or solvents shall not be discharged into sanitary or storm sewer systems. Washout from concrete trucks shall be disposed of at a controlled location not subject to runoff into coastal waters, and more than fifty feet away from a storm drain, open ditch, or surface waters.
- 3. Provide and maintain adequate disposal facilities for solid waste, including excess concrete, produced during construction.
- 4. Provide and maintain temporary sediment basins (including debris basins, desilting basins or silt traps), temporary drains and swales, sand bag barriers, wind barriers such as solid board fence or hay bales, and silt fencing.
- 5. Stabilize any stockpiled fill with geofabric covers or other appropriate cover, and close and stabilize open trenches as soon as possible.
- 6. Prior to final inspection of the proposed project, the applicant shall ensure that no gasoline, lubricant, or other petroleum-based product was deposited on the beach or at any beach facility. If such residues are discovered, the residues and all contaminated sand shall be reported to the Planning Division in order to determine if the removal and disposal of the contaminated matter shall require a permit amendment pursuant to the requirements of the Coastal Act and the California Code of Regulations.

The Construction Best Management Practices Plan approved by the Planning Division pursuant to this provision shall be attached to all final construction plans. The permittee shall undertake the approved development in accordance with the Construction Best Management Practices Plan approved by the Planning Division pursuant to this provision. Any proposed changes to the approved Construction Best Management Practices Plan shall be reported to the Planning Division in order to determine if the proposed change shall require a permit amendment pursuant to the requirements of the Coastal Act and the California Code of Regulations. No changes to the approved plan shall occur without an amendment to this coastal development permit unless the Planning Division determines that no amendment is legally required.

- II. **Staging area:** A staging area will be set up in the overflow parking area at Arroyo Burro Beach County Park, with the concurrence of County Parks Department staff (see Exhibit 4, Sheet 3). The staging area is located to allow vehicle access through the parking area and to avoid the trailhead to the Douglas Family Preserve. It is also located to avoid two specimen Coral Trees at the easterly end of the parking area. The following requirements will be incorporated into the final plans:
 - A. Prior to issuance of the building permit, the contractor shall submit a construction staging plan for review and approval by the Planning Division which indicates that the construction staging area(s) and construction corridor(s) will minimize public access impacts to the public beach and impacts to sensitive habitats.
 - 1. The plan shall demonstrate that:
 - a. Coordination with County Parks staff has occurred and that they have accepted the plans.
 - b. Construction equipment, materials, or activity shall not occur outside the staging area, construction corridor, and construction area identified on the site plan required by this provision.
 - c. Construction equipment, materials, or activity shall not be placed on the sandy beach outside of the immediate construction zone.
 - d. The construction staging area will gradually be reduced as less materials and equipment are necessary.

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- e. The construction access route will only be intermittently closed for transport of equipment and materials. When not in use for transportation of equipment and materials, it will be made available for undisrupted public access.
- 2. The plan shall include, at a minimum, the following components:
 - a. A site plan that depicts:
 - (1) limits of the staging area(s);
 - (2) construction corridor(s);
 - (3) construction site;
 - (4) location of construction fencing and temporary job trailers with respect to the existing parking lot, day use area and the sandy beach.
- 3. If fill is necessary to improve access to the beach west of the restaurant, it shall be clean fill and shall be removed when construction is complete.
- B. The contractor shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Planning Division for consideration and possible approval.
- III. Stair Closure: The entire length of Mesa Lane Stairs will be closed to the public during construction. Total onsite construction work is expected to last about three months. The Parks and Recreation Department will submit a closure plan, including fencing and signage, prior to issuance of the building permit. All public access to the stairs will be prohibited for the duration of construction. A sign shall be placed at the top of the stairs that states:

Mesa Lane Stairs is closed for repair from September 20** through November 30, 20**. Recommended coastal access is available at Arroyo Burro (Hendry's) Beach to the west and Shoreline Park and Ledbetter Beach Park to the east. Parking is available at all three locations. Please contact the City of Santa Barbara Parks and Recreation Department if you have any questions at (805) 564-5418

The sign will also include a map showing the alternate access locations.

- IV. Construction Access: Access for construction will be from the Staging/Storage area around the westerly side of the restaurant onto the beach, across the mouth of Arroyo Burro Creek and easterly along the beach to the construction site. Access will only occur when tides are low enough to avoid taking construction vehicles and equipment through ocean water to get to the construction site on the beach. A Water Quality and Habitat Protection Plan will be in place to minimize any potential effects on the mouth of Arroyo Burro Creek and species using the creek, as outlined above. It is possible that it will be necessary to deposit fill at the ramp to improve the radius of the turn onto the beach. If it is necessary, it shall be clean fill and shall be removed once construction is complete. It is also possible that it will be necessary to remove two large eucalyptus tree trunks so that equipment can travel in the sand.
- V. **Demolition:** All of the concrete landing and stairs, existing timbers, landing staircase and guard and handrails will be removed. The flight of the stairs immediately above the stair segment being replaced will be supported and braced during construction. Demolition materials will be hauled out along the beach westward to Arroyo Burro Beach County Park. Demolition will take about 5 working days. Demolition debris will be recycled to the extent feasible.
- VI. Construction: After demolition is complete, holes will be drilled for caissons. The stainless steel piles will be inserted into the holes and concrete poured to fill the holes around the piles. Forms will

City of Santa Barbara Parks and Recreation Department Mesa Lane Stairs Detailed Project Description June 30, 2011 Page 5 of 6

be constructed in place for the concrete stairs and the stairs will be poured. The stairs, guardrails and handrails will be connected to the piles and concrete stairs below. It is possible that concrete will be poured via concrete trucks stationed at Mesa Lane, using a pump system. If that approach is used, concrete trucks shall not arrive at Mesa Lane before 8:00 AM.

- A. The contractor shall comply with the following construction-related requirements:
 - 1. Demolition or construction materials, equipment, debris, or waste shall not be placed or stored where it may enter sensitive habitat, receiving waters, or a storm drain, or be subject to wave, wind, rain or tidal erosion and dispersion.
 - 2. Any and all debris resulting from demolition or construction activities, and any remaining construction material, shall be removed from the project site within 72 hours of project completion.
 - 3. Sand from the beach, cobbles, or shoreline rocks shall not be used for construction material.
 - 4. All excavated beach sand shall be re-deposited on the beach.
 - 5. Concrete trucks and tools used for construction of the stairs shall not be rinsed at the site.
 - 6. Construction equipment shall not be stored outside the staging area.
 - 7. Sandy beach and habitat areas shall not be used for staging or storage of equipment.
 - 8. No work shall occur on the beach between Memorial Day weekend and Labor Day of any year.
 - 9. Demolition or construction debris and sediment shall be removed from work areas each day that demolition or construction occurs to prevent the accumulation of sediment and other debris that may be discharged into coastal waters.
 - 10. Machinery or construction materials not essential for project improvements will not be allowed at any time in the intertidal zone.
 - 11. If turbid conditions are generated during construction, a silt curtain will be used to control turbidity.
 - 12. Floating booms will be used to contain debris discharged into coastal waters and any debris discharged will be removed as soon as possible but no later than the end of each day.
 - 13. Non buoyant debris discharged into coastal waters will be recovered by divers as soon as possible after loss.
- 14. All trash and debris shall be disposed in the proper trash and recycling receptacles at the end of every construction day.
 - 15. The contractor shall provide adequate disposal facilities for solid waste, including excess concrete, produced during demolition or construction.
 - 16. Debris shall be disposed of at a legal disposal site or recycled at a recycling facility. If the disposal site is located in the Coastal Zone, a coastal development permit or an amendment to this permit shall be required before disposal can take place unless the Planning Division determines that no amendment or new permit is legally required.
 - 17. All stock piles and construction materials shall be covered, enclosed on all sides, located as far away as possible from drain inlets and any waterway, and shall not be stored in contact with the soil.
 - 18. Machinery and equipment shall be maintained and washed in confined areas at the staging area specifically designed to control runoff. Thinners or solvents shall not be discharged into sanitary or storm sewer systems.
 - 19. The discharge of any hazardous materials into any receiving waters shall be prohibited.
 - 20. Spill prevention and control measures shall be implemented to ensure the proper handling and storage of petroleum products and other construction materials. Measures shall include a designated fueling and vehicle maintenance area with appropriate berms and protection to prevent any spillage of gasoline or related petroleum products or contact with runoff. The area shall be located as far away from the receiving waters and storm drain inlets as possible.
 - 21. Best Management Practices (BMPs) and Good Housekeeping Practices (GHPs) designed to prevent spillage and/or runoff of demolition or construction-related materials, and to contain sediment or

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contaminants associated with demolition or construction activity, shall be implemented prior to the onset of such activity.

22. All BMPs shall be maintained in a functional condition throughout the duration of construction activity.

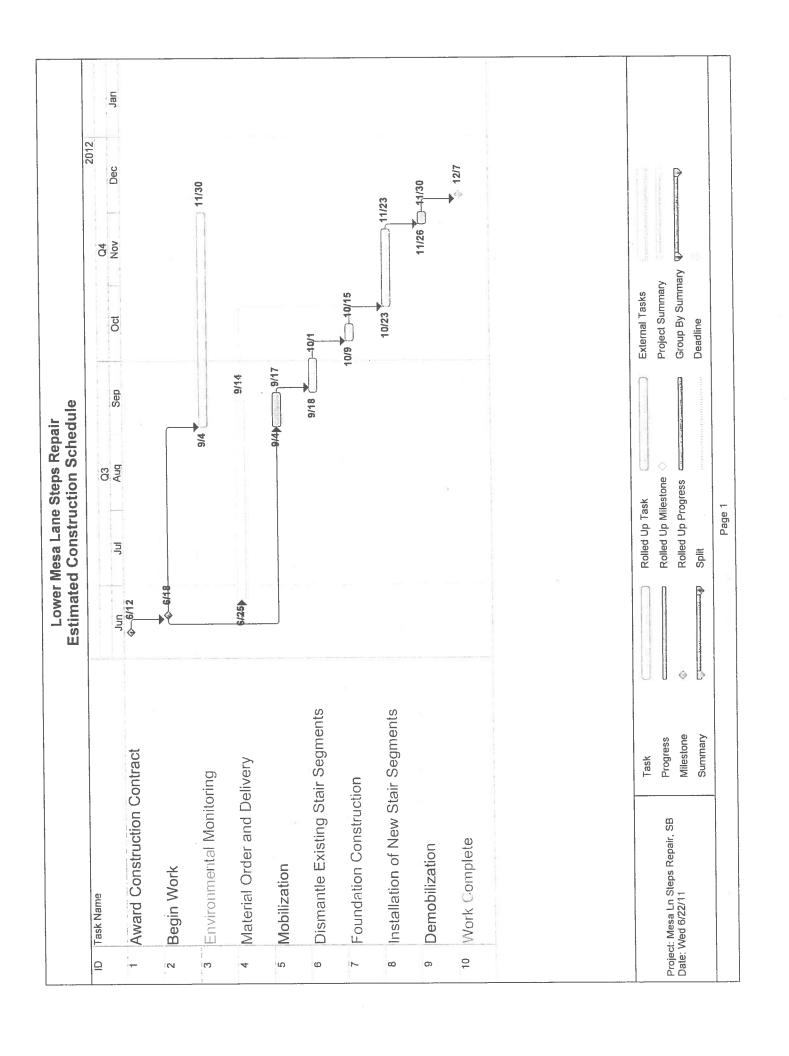
Anticipated Construction Workers and Equipment Schedule:

The following table shows the number of construction workers and the types and numbers of equipment and vehicles expected during construction.

Demolition				Start Date:	9/5/2012
Equipment Category	% Use	No. Equipments	No. days	No. Workers	Frequency / Day
Hoe Ram	80	1	5	1	All Day
Back Hoe	50	1	5	1	All Day
Excavator	75	1	5	1	All Day
Cutting Torch	50	1	5	1	All Day
Hauling/Pickup Truck	80	1	5	1	8
Fork Lift	80	1	5	1	5
Crane SC40 300 HP Width 8'-12'	60	1	2	1	2
Air Compressor	90	1	5		All Day
Front End Loader	80	1	5	1	8
Foreman/Laborer/Env. Coordinator	100		5	5	
					:-

SubTotal: 13

Construction				Start Date:	9/19/2012
Equipment	% Use	No. Equipments	No. days	No. Workers	Frequency
Category	per Day	Equipments	140. days	VOIKEIS	/ Day
SoilMec SC60 - 350 HP Width 8'-12'	95	1	1	1	2
Crane SC40 300 HP Width 8'-12'	95	1	5	1	2
Hauling/Pickup Truck	50	1	45	1	All Day
Concrete Pump	80	1	3		4
Air Compressor	90	1	45		All Day
Water Pump for dewatering	50	2	3	1	All Day
Foreman/Laborer/Env. Coordinator	75		45	6	
SubTotal:				10	



CONCEPT REVIEW - NEW ITEM: PUBLIC HEARING

3. END OF MESA LN ROW Zone

(4:10)

Assessor's Parcel Number: 000-000-0RW

Application Number:

MST2011-00280

Owner

City of Santa Barbara

(Proposal to replace the lower portion of the existing beach access stairs located at the end of Mesa Lane. The project would replace the existing lowest landing and bottom flight of stairs to the beach. Planning Commission review of a Coastal Development Permit is requested.)

(Comments only; project requires environmental assessment and Planning Commission review of a Coastal Development Permit.)

Actual time: 3:55

Present: Jan Hubbell, Project Manager, Parks and Recreation; Abu Syed Israil, Bengal

Engineering; Jill Zachary, Assistant Parks & Recreation Director.

Ms. Hubbell provided the staff presentation and responded to questions and comments from the Board.

Public comment was opened at 4:05 p.m.

Susan Trescher: suggested revising the drawings to show the easement to the west of the project similar to the easement to the east.

A letter from Russell Ruiz addressing concerns of construction staging, timing of steps closure, and needed maintenance was acknowledged.

Public comment was closed at 4:09 p.m.

Motion: Continued indefinitely to the Planning Commission and return to the Full Board with the following comments:

1) Overall the design is acceptable.

- 2) Provide sections through the guardrail/handrail assembly and show lower rail extension.
- 3) Provide details of visual warning strips at the stairs.
- 4) Study construction staging to minimize vehicle trips on the beach.

Action:

Rivera/Sherry, 6/0/0. Motion carried. (Mosel absent)

GENERAL PLAN AND LOCAL COASTAL PLAN POLICIES

RELATED TO THE MESA LANE STAIRS

LAND USE ELEMENT

Beaches (partial quote)

The City's beach system is one of its most important recreational assets. As distinguished from the overall parks and recreational system, the beaches relate closely to the basic character of Santa Barbara, being oriented primarily to the ocean and more sensitive to weather and climate. With this relationship the beaches are an important recreational focal point for the community, as well as a source of attraction for visitors, who are an important element of the City's economic base.

There are approximately three miles of City-owned beaches extending from Shoreline Park on the Mesa to the Andree Clark Bird Refuge. In addition, several miles more of tidal beaches at the foot of the Mesa Bluffs offer a considerably different shoreline experience. Here the higher tides occasionally cover the entire beach to the base of the bluffs. At low tides the receding ocean exposes broad areas of smooth-packed sand, ideal for walking, and numerous shallow pools with their fascinating display of tidal marine life. Convenient access to these interesting beaches should be provided at several points, while still keeping most of the area as a secluded, quiet walking beach. Attempts to make improvements of any kind to these natural tidal areas, with the purpose of increasing the intensity of use, should be discouraged.

...[A]ll City beaches must be well maintained so that they can retain their attractiveness and realize their full recreational potential. Alterations to the natural ecological systems of the ocean shore must be avoided.

It is recommended that the General Plan include provisions for the retention and protection of the tidal beach at the base of the Mesa Bluff in its natural state, prohibiting the installation of any improvements which would change the nature or use of the area. Measures to prevent cliff erosion should be investigated.

OPEN SPACE ELEMENT

The Mesa Stairs are part of the Shoreline, described in the Open Space Element as follows:

SHORELINE

The Shoreline consists of the surf, harbor, harbor facilities, beaches, bluffs, and adjacent park areas. The shoreline complex is an actively used open space, but is also important visually to the community. The protection and development of the shoreline area is covered in the Harbor and Shoreline section. The preservation of the shoreline as an open space will require care in the types of improvements that are allowed to be sure that the natural qualities are not destroyed or obscured. The Harbor and Shoreline discussion notes that excessive development for one particular group of users could easily deprive the community as a whole of the shoreline as an open space.

IMPLEMENTATION

SHORELINE

- 1. Determine need for access to the shoreline. Acquire necessary rights-of-way by January 1, 1975.
- 2. Improve all access routes to the shoreline by July 1, 1977.
- 3. Prohibit the installation of any improvements that would change the nature of the tidal beaches at the base of the Mesa bluff.
- 4. Examine methods of preventing cliff erosion and institute any programs found to be effective.

Exhibit E Mesa Lane Stairs General and Local Coastal Plan Policies Page 2 of 9

5. Delineate all public beach areas and dedicate them for public open space and recreation purposes by July 1, 1973.

CONSERVATION ELEMENT

SHORELINE

The shoreline, harbor, and waterfront areas are key aesthetic assets which provide diverse recreational opportunities and passive enjoyment of the sea, sand, and scenic views. From the beaches, views of the ocean and the islands, with sailboats in the harbor, are the dominant visual elements. Cabrillo Boulevard, a designated scenic highway, has views of not only the ocean and Palm Park, but also of the Bird Refuge, Child's Estate, Montecito foothills, and the Santa Ynez Mountains. (See the Scenic Highways Element for a further description of Cabrillo Boulevard. Other scenic routes include parts of Sycamore Canyon Road, Stanwood Drive, Mission Ridge Road, and Mountain Drive.) The importance of the harbor and the shoreline as scenic resources cannot be overestimated, as the City's location at the juncture of land and sea is fundamental to the charm and character of the community. The significance of this resource is reflected by the designation of "unique visual sensitivity" on the Scenic Resources map.

Scenic corridors providing views of the hills and mountains, as seen from the beach and Cabrillo Boulevard, are valuable resources. Despite the presence of a substantial number of tourist-oriented developments on the inland side of Cabrillo Boulevard, view corridors continue to exist. If development is allowed in these remaining open areas without proper height, set back, and design limitations, the visual corridors could be blocked and inland views impaired, thereby causing a decline in the aesthetic amenities of the shoreline. Palm Park and the beachfront are particularly sensitive to such "filling in" of view corridors.

VISUAL RESOURCES

Goals

- Protect and enhance the scenic character of the City.
- Protect significant open space areas from the type of development which would degrade the City's visual resources.

Policies

- 3.0 New development shall not obstruct scenic view corridors, including those of the ocean and lower elevations of the City viewed respectively from the shoreline and upper foothills, and of the upper foothills and mountains viewed respectively from the beach and lower elevations of the City.
- 5.0 Significant open space areas should be protected to preserve the City's visual resources from degradation.

BIOLOGICAL RESOURCES

Goal

• Enhance and preserve the City's critical ecological resources in order to provide a high quality environment necessary to sustain the City's ecosystem.

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Subgoals

- Develop a permanent park, recreation, and open space system which maintains important ecological systems while providing open space and recreational needs.
- Maintain, protect, and enhance marine resources within the City boundaries.
- Increase public understanding of the relationship between the maintenance of the City ecosystem and the welfare of the general public.

Policies

6.0 Intertidal and marine resources shall be maintained or enhanced.

LOCAL COASTAL PLAN

MESA LANE TRAIL

Location:

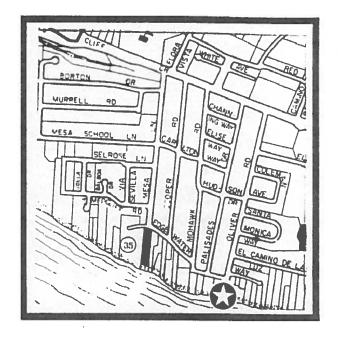
Seaward end of Mesa Lane (at Edgewater Way).

Ownership:

City of Santa Barbara (20 ft. wide public right of way to the mean high tide line). Trail traverses private property near the beach.

Topography:

Apparently a historic landslide area, the descent begins gradually, then is quite steep in the middle and again near the beach. The street is about 142 ft. above sea level.



Nature of Accessway:

The trail is well worn by foot traffic and has crude wooden stairs held in place by pipe or wooden stakes in the steepest section (hand railing is also present in one of the most difficult sections). The bottom stretch of the trail is the exposed surface of a seaward inclined strata which makes this segment of the trail especially treacherous when wet.

Parking

No off-street parking is provided. Within two blocks, on-street parking for approximately 98 vehicles

Comments:

Portions of the trail have become quite deeply worn due to foot traffic and runoff. Some of the crude stairs are in disrepair. The trail is a strenuous climb in the steep portions. No provisions are made for trash, and littering is commonplace.

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Bluff area beaches such as that at the bottom of Mesa Lane Trail serve two publics. The neighborhood immediately adjacent to the accessway (within an approximate 3,000 foot distance) is the area of primary benefit; these persons benefit most due to their proximity to the points of access. The second group served by the beach area is composed of those persons who come from a greater distance. The physical condition of the beach (narrow, limited area which is totally inundated in some spots at high tide) and the bluffs (geological characteristics which limit the number of places in which accessways are feasible and/or environmentally desirable), and the residential nature of the Mesa area, lead to the assumption that other-than-neighborhood use should be encouraged only at those locations where facilities are available, or could be made available, to accommodate the needs of those who come from some distance. Accessways incapable of serving the larger-than-neighborhood public should not be expected to serve the needs of that group.

The Mesa Lane Trail is an example of an access route which, because of the lack of a well-engineered structure, is needlessly contributing to the erosion of the bluff. Moreover, it is unsafe in its present condition. A safe, efficient, and environmentally sound accessway is needed and desirable. A well constructed stairway can be emplaced, designed to recognize and accommodate the angle of the bedding planes, wave action at the bluff toe, drainage, and the general protection of the bluff.

At the same time, it is vitally important to respect the residential character of the neighborhood. Upgrading of the beach accessway could attract even larger numbers than are currently visiting the area (nearby residents have indicated that the popularity of the access route has increased during recent years and that a significant proportion of the new visitors are from outside of the Mesa neighborhood). Onstreet parking is not seriously deficient, although it is not uncommon to find all spaces within one block of the trail entrance occupied. A nearby portion of Mesa Lane which is currently unimproved could be developed to provide additional parking.

Recreation Policies

Policy 2.1

Public access in the coastal bluff areas of the City shall be maximized consistent with the protection of natural resources, public safety, and private property rights. To this end, existing vertical accessways at Mesa Lane Trail, Camino Al Mar, and Shoreline Park shall be maintained and improved.

Actions

The City shall embark upon an educational program to inform bluff top residents to minimize bluff retreat through proper irrigation and drainage control.

City owned vertical accessways at Mesa Lane Trail, Camino Al Mar, and Shoreline Park will:

- Provide a stairway or similar structure which allows safe pedestrian passage and does not aggravate erosion of the bluff.
- Be maintained on a regular basis by City personnel.
- Have heavy duty trash receptacles and regular collection provided.
- Have an identification sign declaring:
 - 1. That it is a public access to the beach;
 - 2. That users must be cognizant of high tides which can isolate portions of the beach;
 - 3. That collecting marine specimens damages our beaches and is expressly forbidden;

Exhibit E Mesa Lane Stairs General and Local Coastal Plan Policies Page 5 of 9

- 4. That vertical access is restricted to the accessways provided, for reasons of bluff protection and public safety (all signs will be compatible with other Park Department signs in terms of design and materials).
- Provide bicycle racks.

More specifically:

Mesa Lane Trail

- With full consideration of the geology and drainage of this site, this access is to be improved with the addition of stairs in the steepest sections and wooden walkways in the more gently sloping sections. Easements from the affected property owners are to be obtained, if necessary.
- A barrier to prevent vehicular access is to be installed (this is not to interfere with use of the driveway of adjacent residence).
- Benches are to be provided at the top of the trail.
- That portion of Mesa Lane (just north of Edgewater Way) which is currently unimproved, should be improved to provide parking.

Shoreline Park

- Place signs in parking lots and along the bluff edge that clearly indicate the location of the stairway. (Signs should inform as to the precarious and fragile nature of the bluff as well as giving direction to the stairway.)
- The City shall undertake a program to minimize bluff retreat through proper irrigation and drainage control.

Policy 2.5

Vista points shall be provided and maintained in areas where such use by the public has been established.

Actions

- In the event Cliff Drive is improved or changed in the vicinity of the "Braemar Terrace," parking spaces should be provided within the public right of way in order to allow motorists to stop and view the scenic qualities of the coastal environment. Trash containers and benches should also be provided within the public right of way.
- As a condition of Wilcox property development, a linear strip along the bluff's edge shall be offered for dedication in the same manner as the open space in Policy 2.2 to provide vista points and to serve as open space buffer zones between the bluff's edge and the nearest roadway. The area shall be required to be landscaped with drought resistant vegetation.
- A sign is to be posted at the street terminus explaining the safety and environmental concerns which necessitate prohibiting access to the beach and directing beach goers to the Mesa Lane Trail (approximately 1000 feet to the west). A barrier to prevent motorcycle access is to be installed.
- The vacant U. S. Coast Guard parcel located east of the existing fence is to be acquired, if feasible, by the City for development of a vista point adjacent to the sidewalk. A wooden platform with railings could be constructed if deemed advisable by a licensed geologist.
- All public vista points will:
 - 1. Provide signs indicating the fragile nature of the bluffs and the location of the nearest beach accessway.
 - 2. Provide heavy duty trash receptacles with regular collection.
 - 3. Be maintained by City personnel on a regular basis.

Exhibit E Mesa Lane Stairs General and Local Coastal Plan Policies Page 6 of 9

- 4. Be for passive use only.
- 5. Provide benches where appropriate.
- 6. Employ drainage systems least damaging to the bluffs.
- The California Coastal Conservancy, State Department of Parks and Recreation, and the State Department of Fish and Game will be contacted as potential sources of funds for the acquisition and development of areas suitable for vista points, pedestrian accessways, public parking, and bikeways.

General Biotic Resources Policies

Policy 6.1

The city, through ordinance, resolutions, and development controls, shall protect, preserve, and, where feasible, restore the biotic communities designated in the City's Conservation Element of the General Plan and any future annexations to the City, consistent with PRC Section 30240.

Action

- City to enact necessary ordinances, resolutions, and development controls.

Policy 6.2

The City will support and encourage the enforcement of all laws enacted for the purposes of preserving and protecting marine resources, maintaining optimum populations of marine organisms and maintaining the quality of the marine environment for the protection of human health.

Policy 6.3

Seawalls, revetments and bulkheads shall not be permitted unless the City has determined that they are necessary to, and will accomplish the intent of protecting existing principal structures, and that there are not less environmentally or aesthetically damaging alternatives such as relocation of structures, sand augmentation, groins, drainage improvements, etc. Determinations permitting such structures shall be based upon the findings and recommendations of geology, soils and engineering reports prepared by licensed and registered professionals in those fields.

Policy 6.4

Where permitted, such structures as seawalls, revetments and bulkheads, shall minimize, to the degree possible, alterations of the natural landform.

Policy 6.5

Seawalls, revetments, bulkheads and all other permitted structures shall not encroach upon any beach area to a degree which impedes lateral access along the beach at any tide condition.

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Policy 6.6

Revetments, seawalls, bulkheads, groins, pipelines, outfalls and other necessary permitted construction shall be designed to eliminate or mitigate to the maximum extent adverse impacts on local shoreline sand supply.

Policy 6.7

To avoid the need for future protective devices that could impact sand movement and supply, no permanent above-ground structures shall be permitted on the dry sandy beach except facilities necessary for public health and safety, such as lifeguard towers and restrooms.

Creek Environments Policies

Policy 6.8

The riparian resources, biological productivity, and water quality of the City's coastal zone creeks shall be maintained, preserved, enhanced, and, where feasible, restored.

Actions

- The feasibility and advisability of using reclaimed water for the purpose of enhancing creek flow, in the event a tertiary wastewater treatment system is developed, shall be studied; if it is deemed feasible and advisable, use of reclaimed water for creek flow enhancement shall be implemented.
- The City shall make application to all Federal and State agencies, as necessary, including the California Coastal Conservancy, for the purpose of funding the following projects:
 - Acquisition of the parcel through which the coastal zone section of Arroyo Burro Creek runs. That portion of the parcel located on the seaward side of the creek would be, in the event of acquisition, retained in its natural state. Access to that habitat would be discouraged.
 - (2) Planning for and implementation of the restoration, enhancement, and maintenance of the coastal zone sections of the City creeks.
 - (3) Planning for and implementation of the restoration, enhancement, and maintenance of the Andree Clark Bird Refuge including a determination of existing conditions.

Policy 6.9

The City shall support the programs, plans, and policies of all governmental agencies, including those of the Regional Water Quality Control Board with respect to best management practices for Santa Barbara's watersheds and urban areas.

Hazards Policy

Policy 8.2

With the exception of drainage systems identified in Policy 8.1, no development shall be permitted on the bluff face except for engineered staircases or accessways to provide public beach access and pipelines for scientific research or coastal dependent industry. To the maximum extent feasible, these structures shall be designed to minimize alteration of the bluff and beach.

Exhibit E Mesa Lane Stairs General and Local Coastal Plan Policies Page 8 of 9

Action

- Amend the Seismic Safety/Safety Element to the City's General Plan to include the above referenced two policies related to hazard reduction of seacliff retreat.

RELEVANT COASTAL ACT POLICIES

Public Access:

- 30210. In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.
- 30211. Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.
- 30214. (a) The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:
 - (1) Topographic and geologic site characteristics.
 - (2) The capacity of the site to sustain use and at what level of intensity.
- (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.
- (4) The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter.
- (b) It is the intent of the Legislature that the public access policies of this article be carried out in a reasonable manner that considers the equities and that balances the rights of the individual property owner with the public's constitutional right of access pursuant to Section 4 of Article X of the California Constitution.

Nothing in this section or any amendment thereto shall be construed as a limitation on the rights guaranteed to the public under Section 4 of Article X of the California Constitution.

(c) In carrying out the public access policies of this article, the commission and any other responsible public agency shall consider and encourage the utilization of innovative access management techniques, including, but not limited to, agreements with private organizations which would minimize management costs and encourage the use of volunteer programs.

Marine Resources:

- 30230. Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.
- 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human

Exhibit E Mesa Lane Stairs General and Local Coastal Plan Policies Page 9 of 9

health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

30232. Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

30235. Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible.

Land Resources:

- 30240. (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.
- (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.
- 30244. Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

Development:

30251. The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

30253. New development shall do all of the following:

- (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.
- (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.
- (c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development.
 - (d) Minimize energy consumption and vehicle miles traveled.
- (e) Where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.

Phone: 805.278.9283 Fax: 805.485.6730

COASTAL ENGINEERING REPORT

FOR

BENGAL ENGINEERING INC.

MESA LANE STAIRCASE REPAIR SANTA BARBARA, CALIFORNIA

PROJECT NUMBER: #10130.BEN

January 24, 2011 (Revised March 23, 2011)

BY
REG K. BROWNE PE
PACIFIC ENGINEERING GROUP
PHONE: 805.278.9283
FAX: 805.485.6730

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March 23, 2011

Mr. A.S. Israil, PhD. PE Bengal Engineering Inc. 250 Big Sur Drive Goleta, CA 93117

Subject:

Coastal Engineering / Wave Uprush Study

Mesa Lane Staircase Repair

Santa Barbara, CA

Reference:

- 1. U.S. Army Corps of Engineers Shore Protection Manual
- 2. Site Visit by Pacific Engineering Group Dated: January 12, 2011
- 3. BEACON Beach Profile #3
 - Beach Erosion Authority for Control Operations and Nourishment By: Noble Consultants Dated July 14, 1989
- 4. Coastal and Ocean Management by John S. Hale Coastal Zone '83
- 5. Coastal Sediments, Los Angeles County by John S. Hale Coastal Sediments '77
- 6. Coastal Sand Management plan for Santa Barbara/Ventura County Coastline prepared for BEACON dated July 14, 1989 by Noble Consultants
- 7. Survey by City of Santa Barbara Department of Public Works, Mesa Lane Stairs, dated 11/18/2010.
- 8. The Impacts of Sea-Level Rise on the California Coast by the California Climate Change Center dated May 2009.
- 9. Evaluation of Tsunami Risk to Southern California Cities, by Legg, Borrero and Synolakis, January 2003, The 2002 NEHRP Professional Fellowship Report funded by Federal Emergency Management Agency (FEMA).
- 10. Beach Erosion and Response (BEAR), California Coastal Commission, Dated December 1999.
- 11. Wave Statistics for Seven Deep Water Stations Along the California Coast Station 5 (33.5 degrees north, 120.4 degrees west)
- 12. Coastal Data Information Program CDIP data buoys: #107 Goleta Point, #071 Harvest
- 13. Geology and Geohazards Master Environmental Assessment for City of Santa Barbara by URS. Dated: March 2009

Our Job #10130.BEN

Dear Mr. Israil:

At your request, this office is please to submit the following Coastal Engineering Report for the repair of the lower portion of the Mesa Lane Beach Access Staircase, near Arroyo Burro Beach, in the City of Santa Barbara, California. The portion of the staircase to be repaired is located at the base of the coastal bluffs in the wave uprush zone. The purpose of this study is to determine coastal design parameters for the repair and reconstruction of the lower portion of the Public Access Staircase and is consistent with the standard of practice for studies along the Southern California coastline. This study presents the results of

a comprehensive coastal engineering analysis of the subject site as it pertains to critical breaking wave characteristics, water level determinations, future sealevel rise projected to year 2060, beach profile, storm scour, erosion or accretion trends, and offshore and local coastline physiography. This report will address:

- 1. Wave run-up analysis from storm waves with a 50-year sea level rise projection.
- 2. A 50-year Erosion Profile
- 3. Wave impact forces on vertical and horizontal surfaces of the lower staircase structure.

Design Parameters to be determined are:

- 1. Design Storm Waves and Design Storm Wave Heights
- 2. Design Storm Scour Profile
- 3. Design Storm Wave Uprush Limit
- 4. Design Wave Impact Forces
- 5. Foundation Design Parameters

1.0 Regional Physiography and Offshore Geographic Setting

The regional Physiography of this section of the California coastline consists of a predominately south facing shoreline characterized by sand and cobble beaches separated by headlands. These beaches tend to be backed by ancient terrace deposit and bedrock bluffs forming the base of the east-west trending Transverse Ranges. The Santa Barbara coastline is unique in that the south facing orientation of the shoreline combined with the sheltering characteristics of Point Conception and the offshore Channel Islands block and refract wave energy from the prevailing northwesterly ocean waves and extra-tropical storm waves generated south of the Channel Islands. The location of the channel islands are particularly relevant as these islands act as a wave filter by creating wave shadow zones that diminish wave energy from southern deep-water swells and wind waves. The resulting wave window permits only those significant waves with certain wave period characteristics, entering the nearshore channel from a central radian direction of 260 degrees (magnetic) to reach the project site.

1.1 Wave Windows and Wave Energies

Wave Window energy calculations based on wave period and underwater bathometry for the subject site conclude that Average Energy Flux Variation for waves with periods 6-18 seconds is on the order of 0.37. This closely compares to the value obtained in the BEACON study of 0.34 for all waves.

1.2 Littoral Drift (Longshore Transport)

The vast majority of the wave energy that does reach the study area and project site enters from the west direction, which typifies the direction of the littoral drift (natural beach sand lateral transport) for this section of coastline. The littoral drift is predominately west to east along the south facing beaches of the Santa Barbara shoreline. Littoral drift rate varies with wave energy intensity. Littoral drift and foreshore slope seasonal oscillation account for the majority of sediment movement in the study area. The project shoreline is located in a sub cell of the Santa Barbara Littoral Cell, which extends from Pt. Conception east to the Mugu Canyon. The sub-cell starts at Point Conception and ends at Santa Barbara Harbor where sediment is trapped and dredged around the harbor entrance to continue east along the cell.

The following is a breakdown of sources of the sediment budget for the project site on Arroyo Burro Beach Littoral Sub-cell according to the BEACON Study:

Source

Average Sediment in cubic yards per year

Total (Average)	270,000
2. Wind (Aeolian) 3. Fluvial (Rivers and Streams) 4. Upstream sources	minor 180,000 <u>17,000</u>
1. Cliff Erosion	73,000

The majority of new sediment (approx. 180,000 cubic yards per year-average) in this cell originates from fluvial sources such as streams and rivers from the Santa Ynez Mountain drainage. Average littoral drift in the cell is approximately 270,000 cubic yards per year. There are no major sediment sinks in the subcell and it is expected that most sediment is transported along the study beach east toward Santa Barbara Harbor by longshore transport. Additional sediment is added to the cell between Arroyo Burro Beach and the Santa Barbara Harbor, mostly from the same source types adding to the sediment load as the littoral drift reaches Santa Barbara Harbor. The BEACON report concludes that the average sediment accumulation at the Santa Barbara Harbor entrance is approximately 350,000 cubic yards per year according to dredging records.

1.3 Cliff Erosion

Cliff Erosion adds to the sediment budget on the study beach of approximately 73,000 cubic yards annually (average). The subject site is located on Arroyo Burro Beach west of the Santa Barbara Harbor. The BEACON study has identified an average cliff face retreat rate for the cliffs west of Santa Barbara Harbor as approximately 0.5 ft. per year. The URS report (ref. #13) for the City of Santa Barbara is less site specific and averages all the cliff retreat rates in the Santa Barbara area to between 0.5 feet per year to a maximum of 1.0 feet per year. It should be understood that this is an average cliff retreat RATE and that the majority of cliff retreat is episodic in nature and not a gradual or uniform process. This report will use the more site specific BEACON bluff retreat rate of 0.5 ft. per year - or 25 feet for the next 50 years - in the calculations and analysis of wave uprush forces for the subject project. It should be noted that the use of either of these bluff retreat rates (BEACON or URS) result in the same design forces for the subject structure since the structure is located seaward of the design shoreline in a zone of constant uprush velocity and uprush height. A topographical Survey provided by the City of Santa Barbara showing the surrounding cliff area is provided in appendix F of this report.

1.4 Fluvial Sources

The amount of sediment delivered to the study beach from fluvial sources varies with the amount of precipitation occurring in the Santa Ynez Mountains watershed drainage area. Since fluvial sources are the major source of sediment on the subject beach (180,000 cubic yards per year), the amount of sediment on the beach is expected to vary proportionally to the amount of run-off and sediment delivered to the beach from rainstorms. During wet years the beach is expected on average to accrete, and during drought the beach on average is expected to erode. Construction of debris basins and dams in the watershed area will reduce the amount of sediment deposited on the study beach - resulting in a net erosion of the subject beach allowing larger waves to break closer to the proposed staircase structure.

1.5 Wind (Aeolian) Sources

Due to the location of the study beach and its proximity to the cliffs, wind transport is considered a negligible component of the subject beach sediment budget.

1.6 Seasonal Beach Profile Variation and Sand Depth

Beach profile variation between summer and winter profiles is relatively small due to high bedrock and sediment limiting (source) conditions. Expected seasonal moment of the beach profile position at MLLW elevation is approximately 35 feet of horizontal variation between summer and winter profiles. This corresponds to a vertical profile variation of approximately 3 vertical feet between winter and summer profiles. Expected summer profile elevation at the stair location is approximately +10 Ft. NAVD88, expected winter profile elevation at the stair location is +7 Ft. NAVD88 or exposed bedrock. Of course actual seasonal beach profile elevations are dependant on sediment supply conditions discussed in section 1.3 and 1.4 above.

Identifiable and measured Beach Profile recovery has been relatively fast after storm scour conditions. According to the BEACON study, the January 17-18, 1988 storm system produced the lowest atmospheric pressure on record and generated the highest deep water waves on record. The storm conditions of the January 1988 event exceeded the storm conditions that occurred during the 1995 and 1998 events. The January 1988 Storm conditions referenced above produced considerable beach erosion - scouring the beach profile down to bedrock on many beaches including the study beach on Arroyo Burro. By May of 1988 beach profile recovery at Arroyo Burro was complete with no visible signs of the storm incident reflected in the beach profile elevation.

During high summer beach profile conditions the <u>depth</u> of sand above the bedrock at the stair location will be no more than 5 vertical feet, from elevation +10.0 NAVD88 down to the design bedrock scour elevation of +5.0 Ft. NAVD88. Sheet BP-1 in appendix F of this report shows various beach profiles used for this analysis including the <u>average summer and winter beach profiles</u> expected at the project site.

2.0 Tides and Historical Water Levels

2.1 Design Tides

Tides in the Study area are semi-diurnal. This means that there are 2 high tides and 2 low tides occurring during a 24-hour period. This tidal fluctuation can also be characterized further as one of the high tides is generally higher than the other, and one of the low tides is lower than the other. This is due primarily to the opposing gravitational forces of the moon and the sun, with the moon producing the greatest force. When the moon is full or new, the moon and the sun are roughly aligned producing spring tides. When these spring tides occur where the moon is at its closest to the earth (at perigee), the tides are described as perigean spring tides. The effect of these perigean spring tides can also be augmented in winter when the earth coincides with perihelion.

The earth, moon and sun go through a complete tidal cycle every 19.4 years. Mean Sea level measurements are taken over this 19.4-year period. The highest recorded water level (including storm surge) measured at the Los Angeles breakwater and Santa Monica Pier was 8.0 FT. MLLW in 1983, and 8.63 FT. MLLW in 1982 respectively. The average height of all the higher high tides during the last cycle was +5.5 FT. MLLW. This study will use a design tide of +6.0 ft. MLLW.

2.2 Storm Surge

Storm surge along the coastline in the study area is relatively small as identified by the Corps of Engineers. Surge driven by atmospheric pressure differences can be on the order of +0.5 feet and lasting for 2 to 6 days. Typical El Nino positive departures form astronomical tides are on the order of +0.2 feet. The 1989 BEACON Study considers storm surge along the Southern California Coastline to be relatively small and less than 12 inches. The BEACON Study identified an 8.4-inch storm surge over predicted astronomical tide levels during the winter storm of January 17 and 18, 1988. This storm recorded the all time record low barometric pressure for the area. This study will use a 9-inch storm surge for design and calculation purposes.

2.3 Sea Level Rise

The Corp of Engineers has characterized long term changes (rise) in sea level due to greenhouse effects, tectonic forces, and other localized ground movement as small as compared to the other components of water levels. Using past trends measured between 1854 and 2006, it is expected that the rate of Sealevel rise would be on the order of +2.0 mm / yr (+4.0 inches for the next 50 years), assuming this rate does not fluctuate from past rates. Based on estimates from the BEACON 1989 report, sealevel rise is on the order of +6 to +8 inches for the next 100 years (projected to 2100).

California Climate Change Center sealevel rise rate estimates provided by the California Coastal Commission have a scenario based estimate of sealevel rise that substantially varies from the current sealevel rise trend. This study identifies three socio-economic impact scenarios based on the speculation that utilization of carbon based fuels will globally increase which will lead to a substantial increase in carbon-dioxide CO2 atmospheric levels - raising global temperatures and subsequently increasing the current rate of sealevel rise dramatically. The California Climate Change Center study speculates that scenario based atmospheric conditions will result in the following projected mean sealevel above present mean sealevel conditions:

<u>Year</u>	Sealevel Rise (m)	
2060	0.6 (23.6")	
2100	1.38 (54.4")	

2.4 Design Still Water Level

Based on the above discussion, the following parameters for Design Stillwater Level elevation will be used in this analysis:

Design SWL	+8.75 FT. MLLW (+8.25 Ft. NAVD1988)
Storm surge Sealevel rise	+9.0 inches +24.0 inches (2060 year projection)
Design tide	+6.0 FT. MLLW

2.5 Elevation Datums

Coastal structures are very sensitive to their elevation as referenced to the level of the ocean, tides, waves, and sand profiles, all of which are constantly and continuously changing in elevation. Therefore it is extremely critical that the elevations that are used for project design and construction are consistent and

referenced to the <u>same vertical datum</u>. There are at least <u>(5) vertical datums</u> that are mentioned and used from time to time in describing elevations for coastal structures. The following elevation datums are described in order of their absolute elevation (from lowest to highest) as they pertain to the Santa Barbara Channel region and project site:

- 2.5.1 <u>M.L.L.W.</u> (Mean Lower Low Water) is the elevation of the average of the lower of the two low tides each day for the 19.4-year cycle. The elevations that are typically used in tide charts and by Coastal and Marine Engineers are referenced to this datum.
- 2.5.2 N.A.V.D. 1988 (North American Vertical Datum of 1988). This datum accounts for the fact that the earth is not a perfect sphere but a shape commonly referred to as a Geoid. The NAVD88 datum is approximately 0.5 feet above the MLLW datum in the study area. Per the referenced survey, the elevation call-outs on the referenced survey are based on this datum.
- 2.5.3 N.G.V.D. 1929 (National Geodesic Vertical Datum of 1929) is the elevation datum commonly used for elevations on the Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM) and other federal and state maps such as topographical maps. In the study area NGVD29 is at the elevation of Mean Sealevel (M.S.L.). The NGVD29 (MSL) datum is 2.8 feet above the MLLW datum, and 2.3 feet above the NAVD88 datum. An example of this would be an elevation of a theoretical existing deck at elevation 18.0 NGVD29 (MSL) could be called out at elevation 20.8 MLLW or 20.3 MAVD88. Hence it is extremely important for all design and construction to be referenced to the same vertical datum and that datum plainly indicated on all plans so that there is no confusion the structure is built at the correct heights in relation to the ocean and the waves.
- 2.5.4. <u>M.S.L</u> (Mean Sea Level) is the elevation of the average of all the high and low tides every day for the 19.4-year cycle. Mean Sea Level is 2.8 feet above M.L.L.W. and 2.3 feet about the N.A.V.D. 1988 vertical datum.
- 2.5.5. M.H.T. (Mean High Tide) is the elevation of the average of all the high tides for each day for the 19.4-year cycle. The elevation of Mean High Tide for the Santa Barbara Channel is 4.7 feet above M.L.L.W. or 4.2 feet above NAVD 1988 datum. Where this elevation of M.H.T. intersects the beach is commonly referred to as the Mean High Tide Line. Since the beach elevation is constantly in a state of change, the mean high tide line "moves" seaward and landward depending on the location or movement of the beach in relation to fixed objects or control lines. In California, "the mean high tide line has been judiciously determined to be the seaward boundary line for a parcel of property, and is the ambulatory boundary between private and state property". This office recommends that the City of Santa Barbara (owner) contact a land use attorney specializing with coastal properties to learn more about the legal issues regarding the seaward boundary and possible vertical and lateral use easements on the subject property.

3.0 Storm Wave Uprush Analysis

3.1 Hindcasting Data

Design parameters for 7 wave periods were investigated for this study using hindcasting data for deep water wave station #5 (33.5 Degrees North, 120.4 Degrees West). This hindcasting data is presented in Appendix B. Wave Energy Windows were then examined for the project site for waves with periods ranging from 6 seconds to 18 seconds (Appendix C). Wave Energy flux due to sheltering and shoaling effects was calculated to determine design significant wave heights at the project location. Comparisons between calculated wave height values and recent historical values obtained from the Coastal Data

Information Program (CDIP) buoys along with the associated data were made. The CDIP buoys used to obtain the comparison data are:

```
Harvest Buoy 071 NDBC # 46218 (34 27.24 N, 120 46.83 W)
Goleta Pt. 107 NDBC # 46216 (34 20.00 N, 119 48.21 W)
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The data comparison suggests that the calculated wave energies for the project site conform to the data directly measure by the CDIP Buoys and are appropriate for use for the design wave spectra. Calculated Wave Energy Flux for all seven wave periods investigated at the project site has an average energy flux of 0.37 which closely approximates the energy flux for the Santa Barbara Harbor location of 0.34 in the BEACON report.

3.2 Significant Wave Heights at the Project Site

Based on the above analysis the following significant waves were used to determine the design breaking wave forces on the project structure located on Arroyo Burro Beach:

Wave	Deep Water Ht. (ft.)	Period (s)	<u>E'</u>	Significant Wave Ht. Ho' (ft.)
1.	8.2	6	0.437	6.0
2.	13.1	8	0.410	9.0
3.	16.4	10	0.385	10.5
4.	4.9	12	0.358	3.0
5.	4.9	14	0.340	2.8
6.	4,9	16	0.330	2.7
7.	9.84	18	0.330	5.43

3.3 Design Beach Profile at the Staircase Structure

BEACON Station #3 (closest station to the subject staircase), located approximately 1-3/4 miles west of the subject structure, was extrapolated for the purposes of determining appropriate breaking wave underwater slope bathymetry at the project location by the adjustment and alignment of the backshore beach and foreshore slope at each location. This method gives appropriate breaking wave underwater slopes at the subject site for the different wave periods which were then used in conjunction with the design beach scour profile for uprush and wave force determination. The station survey data from the BEACON report is presented in Appendix D. Based on Sedimentation budget, littoral drift quantities, referenced BEACON and BEAR reports, and site observations, an appropriate design beach profile for the project design is shown on sheet BP1 at the back of this report. The design beach profile uses the anticipated bluff retreat of 0.5 ft. per year for the bluff face and associated 50 year bedrock scour of 2.5 ft. (0.60" per year) at the toe of the existing staircase structure. Underwater slope bathymetry is based on BEACON Station #3. The design beach profile at the toe of the existing staircase structure is at elevation +5.0 ft. NAVD1988 datum. The design beach profile shown on sheet BP1 at the back of this report must be used for the project design of the structure and represents the anticipated beach level during the design storm event.

3.4 Project Effect on Coastal Processes and Adjacent Landforms

The existing staircase structure on the beach is a rectangular concrete mass pedestal type structure approximately 10.5 feet long, 10.5 feet wide, and 8 feet high supported directly on bedrock. The concrete mass pedestal surrounding (4) 12-inch diameter timber piles supports the lower landing of the staircase. During high tide and surf conditions the existing concrete mass foundation is large enough to substantially deflect wave uprush to the sides thus significantly adding to the erosion of the bluffs to the

sides of the staircase, especially that portion of the bluff immediately to the west of the staircase. The existing concrete mass foundation blocks a significant amount of wave uprush from reaching the bluff face directly landward of the foundation creating a wave uprush shadow zone, and significantly altering the natural wave scour and erosion of the bluff face.

The Engineering Consultant, Bengal Engineering, has proposed three structure options to replace the existing damaged concrete mass pedestal foundation and lower staircase:

Option 1: Multiple Poured-in-place Concrete Piles Embedded in Bedrock

This option uses 4 concrete piles supporting the landing. The piles are approximately 8 feet apart and embedded (drilled and poured) into bedrock. Pile diameter can vary from a minimum of 30" to a maximum of 36". The piles should be embedded a minimum of 12 feet into un-weathered bedrock. A steel reinforcement cage (epoxy coated) is lowered into the drilled pile hole just prior to pouring the concrete. A minimum four-inch (4") concrete cover surrounding the reinforcement cage would be required to protect the reinforcement from corrosive saltwater chemicals and abrasion. Using a Sono-tube to form that portion of the pile above the bedrock will enable a continuous pour (recommended). See section 5 of this report for minimum material specifications. This option will not have any significant effect on the normal coastal processes and a negligible effect on the surrounding landforms.

Option 2: Stainless Steel Piles Embedded in Bedrock

This option uses 4 stainless steel piles at approximately 8 feet on center to support the landing. Twenty-four inch (24") diameter holes are drilled into bedrock and the stainless steel piles are inserted into the holes and socketed in-place by pouring concrete in the annulus between the pile and the bedrock. Minimum pile wall thickness should not be less than 3/8" thick based on anti-corrosion requirements. Consideration should be given to protecting the stainless steel piles from the abrasion effects of wave uprush (sand and cobbles). This would likely involve the use of HDPE plastic jackets attached to the piles with stainless steel straps. This option will <u>not</u> have any significant effect on the normal coastal processes and a negligible effect on the surrounding landforms.

Option 3: Single Concrete Pile Embedded in Bedrock

This option uses one concrete pile to support the landing. Pile diameter can vary from a minimum of 30" to a maximum of 48". The pile should be embedded a minimum of 12 feet into un-weathered bedrock. A steel reinforcement cage (epoxy coated) is lowered into the drilled pile hole just prior to pouring the concrete. A minimum four-inch (4") concrete cover surrounding the reinforcement cage would be required to protect the reinforcement from corrosive saltwater chemicals and uprush abrasion. Using a Sono-tube to form that portion of the pile above the bedrock will enable a continuous pour (recommended). See section 5 of this report for minimum material specifications. This option will not have any significant effect on the normal coastal processes and a negligible effect on the surrounding landforms.

Pacific Engineering Group has performed a review of each of the above three options proposed by Bengal Engineering. Each of these options has less of an effect on the coastal processes than the concrete mass pedestal foundation that currently exists and which is proposed to be replaced. Each of these options neither creates nor contributes significantly to erosion, instability, or destruction of the site or surrounding areas. Each of these options will not require the construction of protective devices that would substantially alter the natural landforms along the bluff and cliffs.

4.0 Storm Wave Uprush and Wave Force Results

4.1 Wave Uprush Results

Using Breaking Wave analysis outline in the US Army Corps of Engineers Shore Protection Manual, uprush limit for each wave outlined in section 3.2 above was calculated and modeled on sheet BP1 attached. Breaking wave height, breaking wave depth, breaking wave velocities, and uprush limits were calculated in order to determine appropriate wave impact forces on the proposed staircase structure. The design parameters (wave conditions, still water level, design beach profile, and uprush limit) used for this analysis surpass the conditions present at the subject site during the 1988, 1995, and 1998 storm conditions referenced earlier in the report. The results of our analysis are presented in Table 4.1 below:

Table 4.1 Wave Uprush Results - Design Parameters

Wave	Ho' (ft.)	T(s)	Crest Ht (Hc) NAVD	Umax (ft/s)	Run up El. (ft.) NAVD
1	6.0	6	+13.8	15.65	+12.02
2	9.0	8	+16.9	19.30	+12.43
3	10.5	10	+18.7	21.50	+11.30
4	3.0	12	+13.0	13.80	+17.40
5	2.8	14	+13.25	14.00	+18.50
6	2.7	16	+13.50	14.40	+18.90
7	5.43	18	+17.40	19.20	+15.40

4.2 Design Storm Wave Forces

Based on the above analysis and the location of the proposed structure being seaward of the design shoreline, wave #3 above governs in the design of the proposed repair/rebuild of the lower staircase structure. Table 4.2 below list the design waves forces for the design of the lower staircase. These forces are to be applied to the vertical and horizontal surfaces of the landing, guardrails and treads. Each force direction is to be applied separately so that forces do not cancel each other. The force direction 0 degrees is a force acting normal to the seaward face of the staircase structure in the direction toward land running in the direction of the breaking wave. The force direction 180 degrees is forces applied to the staircase structure during "outwash" or rundown of the wave as it travels back toward the ocean. The wave forces at 90 and 270 degrees are the design forces resulting from breaking wave reflection of the adjacent cliff walls or flanking wave action on the structure. Each direction for the wave forces act at separate times (non-concurrent) so that the structure must be designed for each direction separately so no wave force directions cancel. These forces assume the proposed staircase is located no further seaward than its present location.

Table 4.2 Design Wave Forces on Staircase Structure

Total Wave Impact Forces on Vertical Surfaces in Pounds per square foot (PSF)

Elevation (NAVD 1988 datum)	Wave Direction (degrees)		
	<u>0 and 180</u>	90 and 270	
8.0 ft. (7.5 ft. – 8.5 ft.)	1144.0	1010.0	
9.0 ft.	1080.0	946.0	
10.0 ft.	1017.0	882.0	
11.0 ft.	953.0	818.0	
12.0 ft.	889.0	754.0	
13.0 ft.	825.0	690.0	
14.0 ft.	761.0	626.0	
15.0 ft.	697.0	562.0	
16.0 ft.	633.0	498.0	
17.0 ft.	569.0	434.0	
18.0 ft.	505.0	370.0 ·	
> 18.5 ft.	0.0	0.0	

Total Wave Impact Uplift Force on Horizontal Surfaces in Pounds / Sq. Foot (PSF)*

Uplift Splash-up Force
460.0 PSF *
377.0 PSF
313.0 PSF
250.0 PSF
185.0 PSF
120.0 PSF
60.0 PSF
0.0 PSF

^{*} Buoyancy forces NOT included. Designer to determine buoyancy forces based on material thickness using density of Seawater = 64.0 PCF. Buoyancy forces are additive to splash-up forces for elevations 8.0 ft.-19.0 ft only.

4.3 Wave Forces on Piles

Wave impact forces on the piles should be assumed to act in each of the four directional axis separately (non-concurrently). The following wave impact forces in Table 4.3 below should be used in the structural pile designs in addition to wave impact forces transmitted to the piles from the staircase structure. Wave impact forces acting on the staircase, platforms, guardrail, and treads that are transmitted to the concrete foundation piles must be accounted for and are additional to the following pile wave impact forces: Table 4.3 Wave Impact Forces on Concrete Piles (Inertial and Drag forces on Circular Piles)

Pile Diameter	Resultant Total Force (LBS)	Resultant Elevation (NAVD88)
12"	9755.0	+12.0 Ft.
30"	24388.0	+12.0 Ft.
36"	29265.0	+12.0 Ft.
42"	34143.0	+12.0 Ft.
48"	39020.0	+12.0 Ft.

5.0 Structural Recommendations

5.1 Piles

All portions of the proposed staircase repair/rebuild located in the wave uprush zone must be supported on a pile foundation with piles embedded into bedrock.

5.1.1 Concrete piles should have a minimum diameter of not less than 30 inches, and a maximum diameter not more than 48". Concrete piles should extend to a minimum depth at elevation -7.0 Ft. NAVD1988 datum, or 12 feet into un-weathered bedrock, whichever is deeper. The minimum pile depth listed above is based on coastal engineering design parameters only. Actual pile depths will be determined by the project Structural Engineer and project Geotechnical Engineer based on anticipated vertical and lateral loads and will likely be deeper than the minimum depth listed above.

5.1.2 Stainless steel piles should have a minimum diameter of 12", have a minimum wall thickness of 3/8", and be embedded a minimum 12 feet into un-weathered bedrock. The minimum pile depth listed above is based on coastal engineering design parameters only. Actual pile depths will be determined by the project Structural Engineer and project Geotechnical Engineer based on anticipated vertical and lateral loads and will likely be deeper than the minimum depth listed above.

5.2 Minimum Concrete Specification

All new structural concrete used for any portion of the project must have a minimum 28-day designed compression strength of 5000 PSI, have 3% air-entrainment, consist of Type V cement, W/C = 0.40 and be properly vibrated into place. This must be clearly specified on the general notes and the foundation plans. Concrete placed in excavations with standing water shall have a 28-day compressive strength 1000 PSI greater than the designed compressive strength.

5.3 Minimum Concrete Reinforcement Specification and Concrete Minimum Cover

All structural concrete reinforcement shall conform to ASTM Std. A615 Grade 60 for deformed bars and be **Epoxy Coated** per ASTM Std. A775. All steel reinforcement (including ties) for concrete piles, beams, walls, and slabs should have a <u>minimum concrete cover of 4 incluse</u> to the adjacent soil or exposed marine environment. This must be clearly specified on the general notes and the foundation plans.

5.4 Structural Steel

Corrosion and abrasion protection is an extremely high priority for the specification of the project construction materials. The designer must have a suitable corrosion protection plan and specification for the materials used in their design. As a minimum, all structural steel exposed to the soil or marine atmosphere should have a minimum thickness of 3/8 inches for the webs, flanges, plates, washers, and tube walls, and be hot dipped galvanized or stainless steel. Additional corrosion protective coatings as such as epoxy paint applied over the galvanized steel as well as corrosion resistant steel should also be investigated by the designer. Abrasion jackets such as HDPE plastic jackets should be considered to mitigate the abrasion effects of the sand and cobbles carried in the wave uprush.

5.5 Marine Exposed Timber and Bolts

All new timber used for the Staircase Repair/Rebuild should be properly pressure treated using ACZA with a retention of 2.50 PCF, or other similar treatment conforming to American Wood Protection Association (AWPA) use category UC5B. All bolts used for the project must conform to ASTM Std. A307 and have a minimum diameter of ¾ inches and be hot-dipped galvanized or stainless steel. All washers used for the Staircase repair/rebuild should have a minimum thickness of 3/8 inches and be hot-dipped galvanized or stainless steel. Hot Dipped Galvanized Malleable washers are also acceptable.

5.6 Referenced Elevation Datum

All elevations called on all the structural plans, architectural plans, and surveys must be referenced to the NAVD 1988 datum. A note on the site plan and foundation plan must specify "All elevations called on these plans are to be referenced and constructed to the NAVD 1988 vertical datum". This datum note must be conspicuous on every sheet of the construction documents.

5.7 Approximate Historical Mean High Tide Line Locations on the Subject Project

MHTL** Distance in feet seaward from Exist Staircase October 1987 April 1988 So November 2010 January 2011 Distance in feet seaward from Exist Staircase 63 50 45

5.8 Removal of Debris from the Beach

West of the subject staircase on the beach sand are large diameter fallen tree trunks from the cliffs above the beach. The subject beach should be kept cleaned of large hazardous debris items especially before each winter storm season. Fallen tree trunks (from the cliff above) and other large debris items located west and east of the subject staircase should be removed from the beach. These items can and will be moved along the beach by storm wave action and could likely collide into the existing or proposed staircase causing extreme damage or collapse of the structure.

6.0 Limitations

6.1 Risks

The City of Santa Barbara (owner) should realize that there will always be certain risks associated with building structures on the beach and assume such risks. Further, Pacific Engineering Group makes no warranty or guarantee that the structures outlined in this report will survive natural forces from any and all storm conditions. The results and recommendations set forth in this report meet current minimum California Building Code and California Coastal Commission standards for design purposes only.

^{**}The past measurements of these MHTL locations were to determine approximate beach location and not necessarily the seaward boundary line for the property. Hence the surveyed measurement of the MHTL and the scale of the MHTL maps used may not approach the accuracy needed for boundary line determination.

Tsunami or hurricane generated waves have an extreme low probability of occurring and producing damage to the subject site and project. However, the possibility of these events producing damage to the subject property does exist, and hence no warranties are provided should these events occur.

6.2 Geological Factors are Not Covered

Given the location of the subject property and the geological make-up of the underlying materials, the owner is strongly advised that a Licensed Geotechnical Engineer should be retained to address the potential for seismically induced liquefaction, land movement or collapse, up-slope stability, and geotechnical factors of safety. Opinions or recommendations regarding the geological stability of the subject site and the potential for liquefaction and Lateral Spreading are beyond the scope and expertise of this report.

6.3 Public Safety

There are certain risks to persons using the subject beach. These risks include but are not limited to; falling debris from the cliffs, episodic sloughing of the bluff face, inundation of the sandy beach by high tide and high surf conditions, rip currents, hidden or submerged rocks in the surf zone, shore breaking waves, and due to the location of the bluff face - a limited or non-existent zone of retreat during high tide and high surf conditions.

6.4 Tsunami Risks

The storm wave conditions and forces analyzed in this report govern in the design of the staircase structure. Tsunami uprush on this beach would be lower than the storm wave uprush investigated, however Tsunami uprush inundation of the beach would have a longer duration.

Given the risk of tsunami run-up on the subject beach and the extremely limited time of advanced warning should a local earthquake trigger a tsunami, the City of Santa Barbara (owner) is advised that the only warning that may be received is the actual shaking of the earthquake itself.

Tsunami warnings issued by the local governing authorities, the Pacific Tsunami Warning Center, or the West Coast Tsunami Center for distant earthquakes or underwater landslides should be taken seriously. It is the understanding of Pacific Engineering Group that the City of Santa Barbara Emergency Services Manager has indicated that the City has a draft Tsunami Response Plan proposed and hopes to have this plan adopted in 2011.

6.5 Boundary Lines or String Lines not addressed

Pacific Engineering Group takes no responsibility for verifying or determining building and foundation setbacks or stringlines, boundary lines, stringlines, flood control elevations, building height restrictions, structural integrity of existing structures or bulkheads, or other design requirements beyond the scope of this report.

6.6 Use of this Report

This report has been prepared for the addressee named above, the City of Santa Barbara (owner), and the design consultants only. This report has not been prepared for use by other parties or for other purposes not mentioned above, and may not contain sufficient information for other than the intended use.

The location of the design beach profile shown on sheet BPI may never be reached during storm events but is used only as a guide for the design of the proposed structures. It is not the purpose of this uprush study to be used as an Environmental Impact Report. Because of the unpredictability of the ocean environment, the above design standards are meant to minimize storm wave damage and not eliminate it.

This report contains a blueprint sheet (Sheet BP1) attached and may not be copied. If you desire additional copies, you may order them through this office.

The professional services performed for this report by this office were conducted in a manner consistent with current building department standards, and based on sound engineering principles, and this writer's own professional engineering judgment. No other warranties are expressed or implied.

Respectfully submitted,

Pacific Engineering Group

Reg K. Browne PE President CE40552

> Mesa Lane Stair Case Repair Coastal Engineering Report Project # 10130.BEN March 23, 2011

APPENDIX A

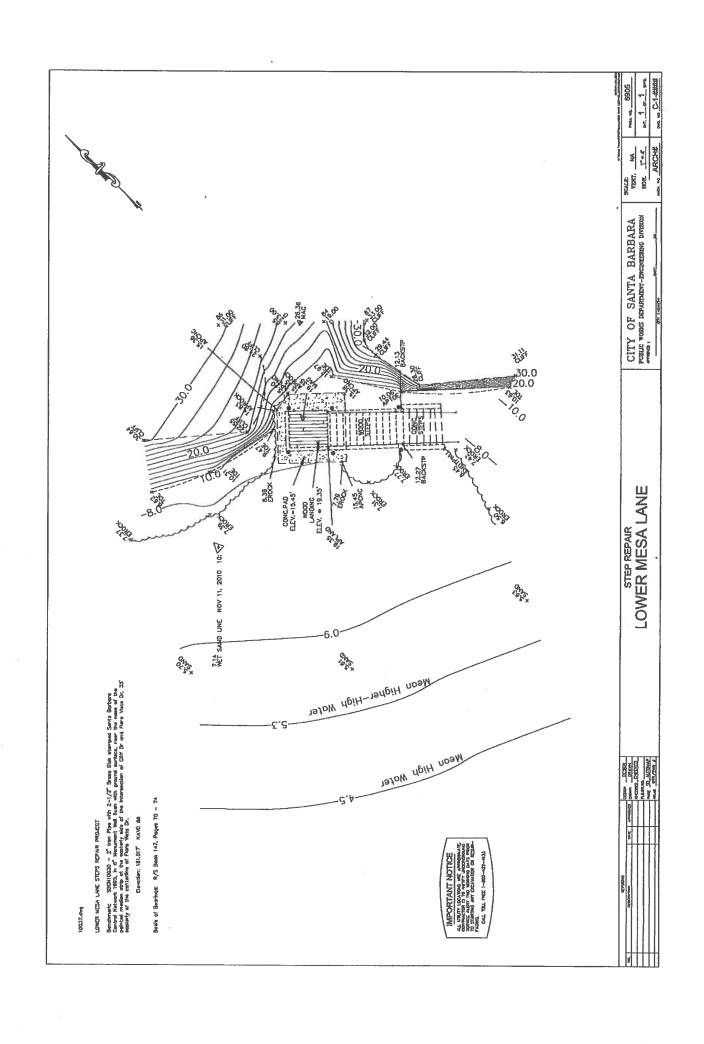
AERIAL PHOTOS, SURVEY, SEALEVEL RISE CHARTS

MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

> Pacific Engineering Group 3500 East Camino Avenue Suite #250 Oxnard, California 93030

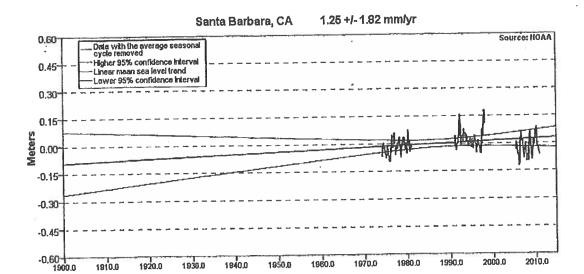






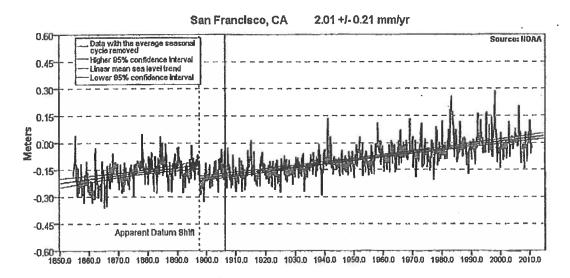
Phone: 805.278.9283 Fax: 805.485.6730

Mean Sea Level Trend 9411340 Santa Barbara, California



The mean sea level trend is 1.25 millimeters/year with a 95% confidence interval of +/- 1.82 mm/yr based on monthly mean sea level data from 1973 to 2006 which is equivalent to a change of 0.41 feet in 100 years.

Mean Sea Level Trend 9414290 San Francisco, California



The mean sea level trend is 2.01 millimeters/year with a 95% confidence interval of +/- 0.21 mm/yr based on monthly mean sea level data from 1897 to 2006 which is equivalent to a change of 0.66 feet in 100 years.

Table A-13

Beach Profiles at Station 3, Arroyo Burro

Distance	3	
from		
baseline		
in feet	OCT-87	APR-88
0	16.6	16.6
50 .	15.62	15.98
100	10.33	9.64
150	9.19	8.24
200	6.3	5.69
250	4.04	2.6
300	1.9	0.21
350	-0.06	-1.61
400	-2.24	-3.48
450	-4.69	-4.35
500	-4.92	-5.47
550	-7.3	-7.75
600	-7.61	-8.19
650	-6.32	-8.00
700	-8.01	-7.97
750	-10.54	-9.19
800	-12.05	-12.07
850 ·	-14.11	-13.74
900	-15.66	-14.31
950	-16.96	~16.00
1000	-19.09	-18.12
1050	-20.85	-20.51
1100	-22.2	-22.39
1150	-23.26	-23.23
1200	-24.27	-23.05
1250	-25.37	-24.28
1300	-26.81	-26.00
1350	-28.65	-28.01
1400	-30.3	-29.39
1450	-31.75	-30.77
1500	-33.19	-32.15
1550	-34.68	-33.51
1600	-35.72	-34.05
1650	-36.82	-36.14
1700	-37.97	-37.21
1750	-39.18	-38.25
1800	-40.32	-39.26
1850	-41.39	-40.47
1900	-42.33	-41.69
1950	-43.54	-42.91
2000	-44.72	-43.96
2050	-45.64	-45.02

2Note: Elevations in feet, MLLW
Data from Corps of Engineers and BEACON surveys

APPENDIX B

HINDCASTING DATA

MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

> Pacific Engineering Group 3500 East Camino Avenue Suite #250 Oxnard, California 93030

1ABLE III.1.13

5 (33.5N 120.4W) ALL YEARS (1951-1974) DIRECTION-HEIGHT-PERIOD FREQUENCY OF OCCURRENCE DISTRIBUTION

STATION COMBINED SEA/SWELL - COMPILED FROM 8727 ONCE-DAILY WAVE COMPUTATIONS

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TABLE III. 1. 19 CONT.)

ALL YEARS (1951-1974) DIRECTION-HEIGHT-PERIOD FREQUENCY OF OCCURRENCE DISTRIBUTION (MPILED FROM 8727 ONCE-DAILY WAVE COMPUTATIONS STATION S (33.5N 120.4W)

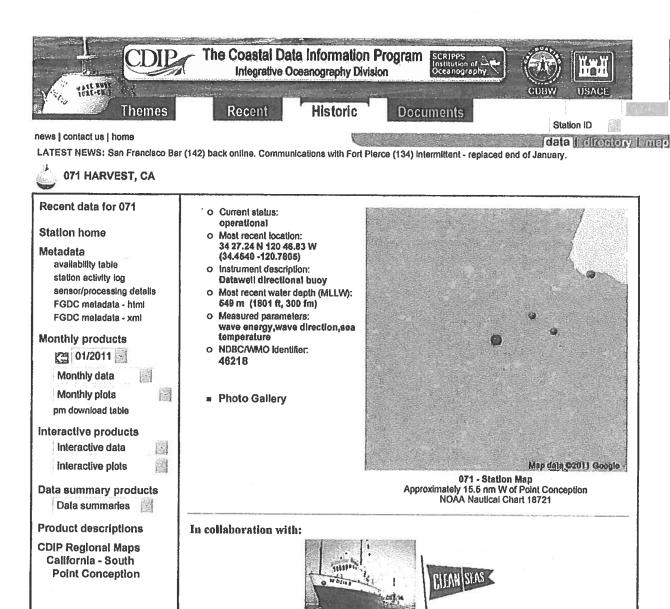
COMBINED SEA/SWELL - COMPILED FROM 8727 ONCE-DAILY WAVE COMPUTATIONS

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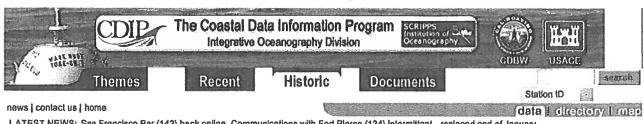
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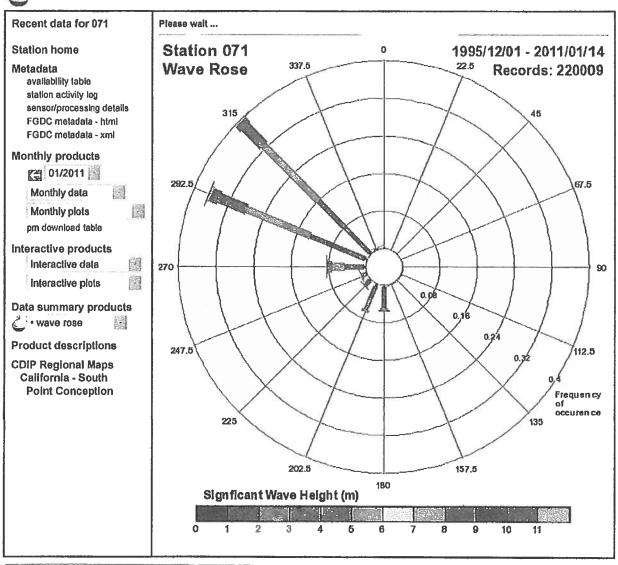
CDIP's major funding contributors are the US Army Corps of Engineers and the California Department of Boating and Waterways,





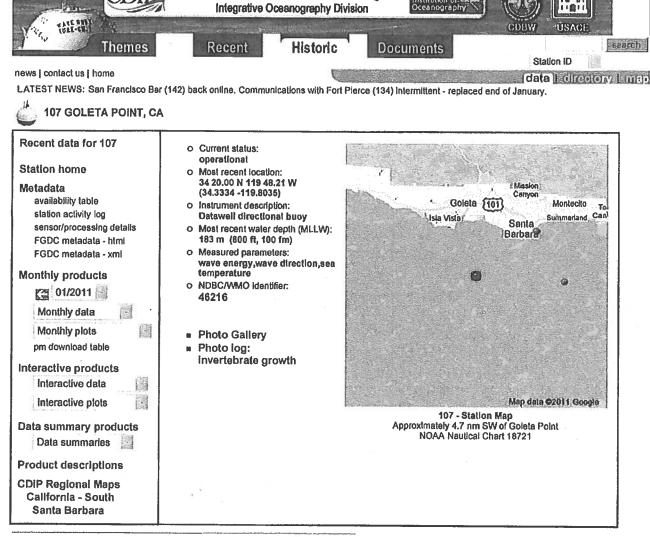
LATEST NEWS: San Francisco Bar (142) back online. Communications with Fort Pierce (134) Intermittent - replaced end of January.





CDIP's major funding contributors are the US Army Corps of Engineers and the California Department of Boating and Waterways.





The Coastal Data Information Program

CDIP's major funding contributors are the US Army Corps of Engineers and the California Department of Boating and Waterways.

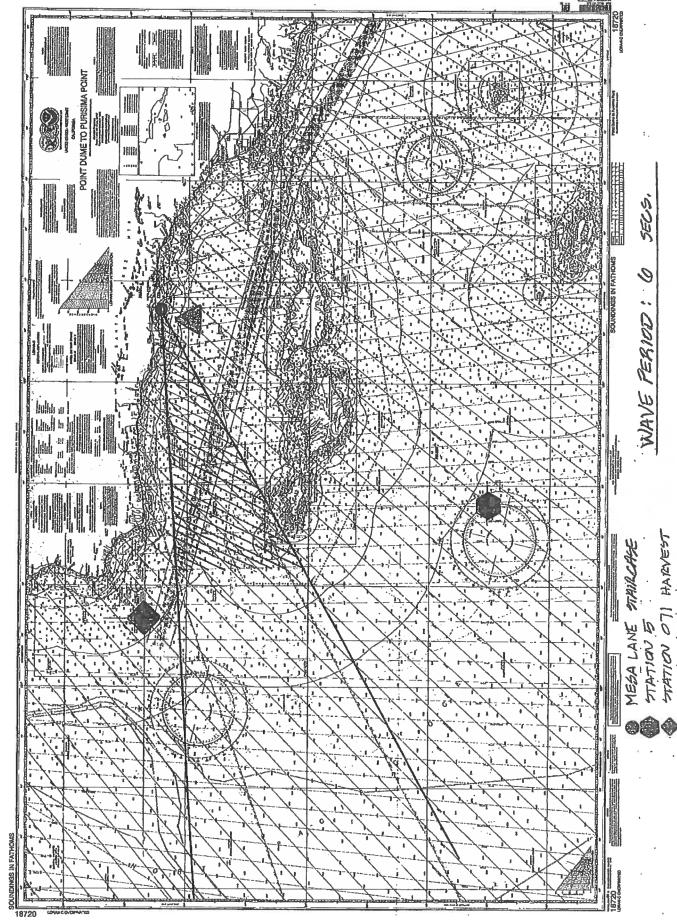


APPENDIX C

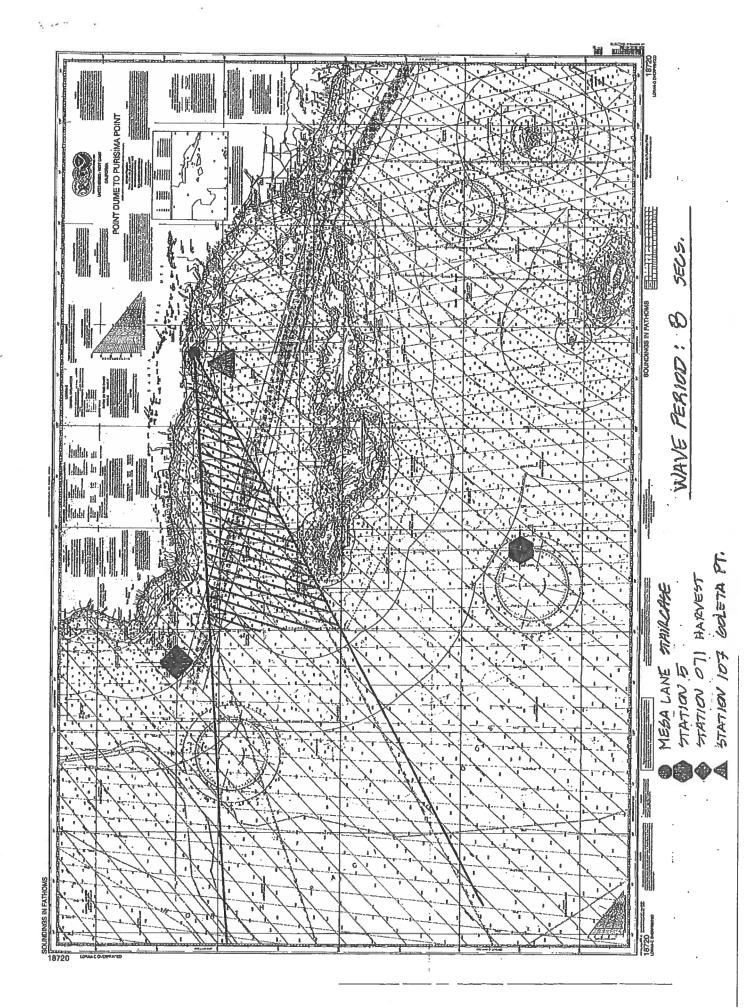
WAVE WINDOW ANALYSIS

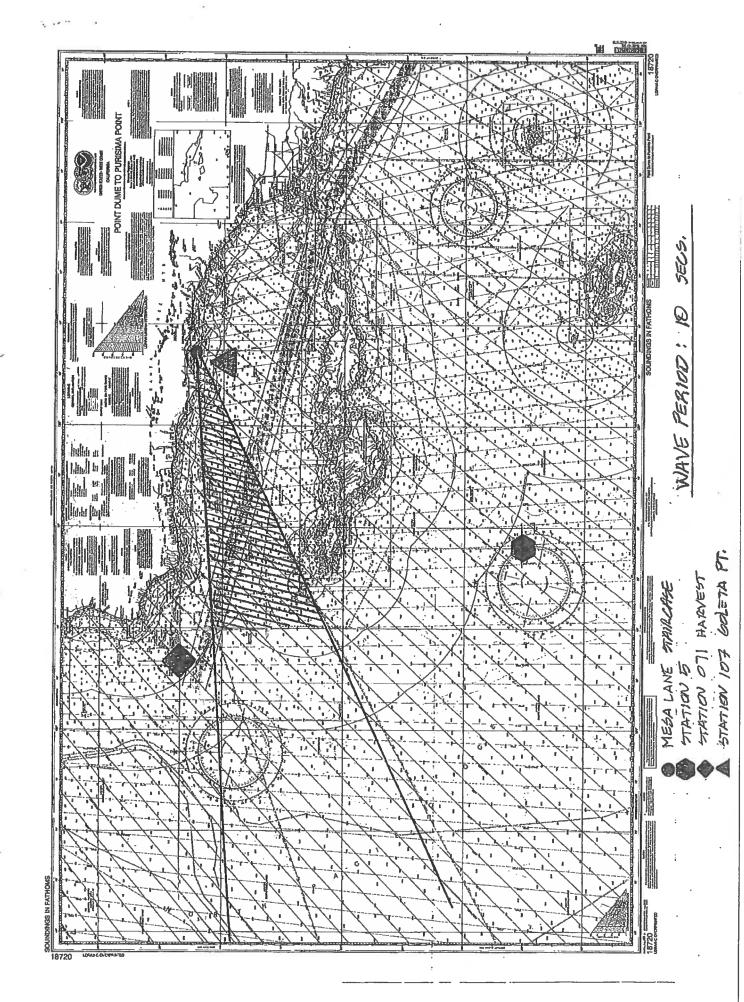
MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

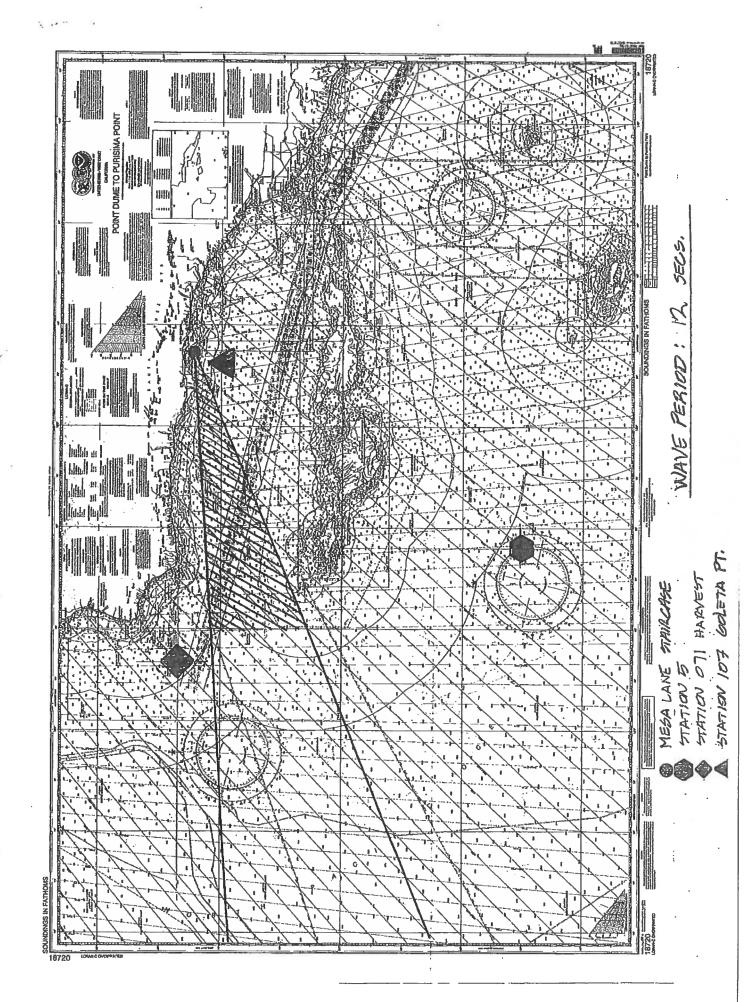
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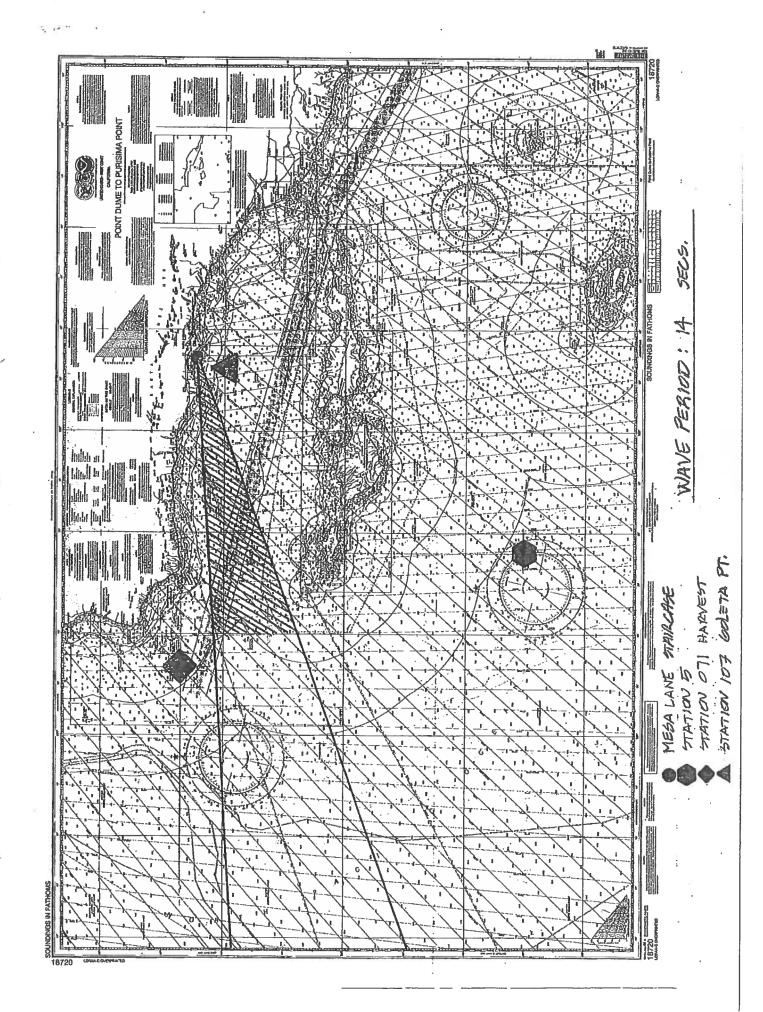


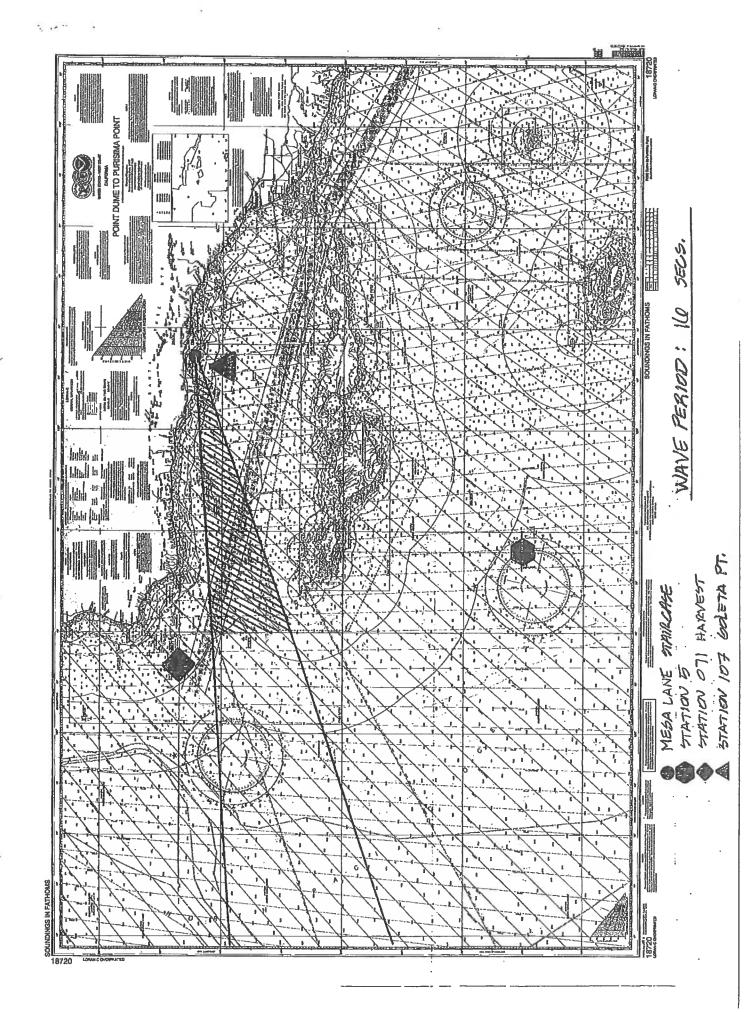
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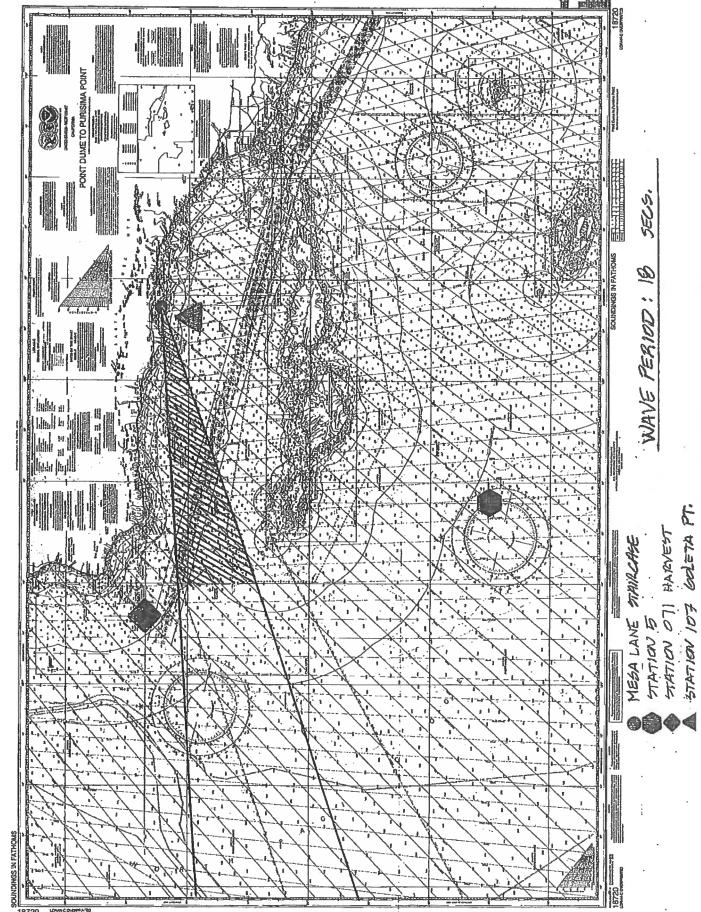












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PACIFIC ENGINEERING GRO. CONSULTING ENGINEERS 3500 EAST CAMINO AVENUE #250 OXNARD, CA 93030 P: (805) 278-9283 F: (805) 485-6730

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4.91	14	,340	1,167	2.8
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9.84	. 18	,330	3,25	5.43

APPENDIX D

WAVE UPRUSH AND IMPACT FORCE CALCULATIONS

MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

> Pacific Engineering Group 3500 East Camino Avenue Suite #250 Oxnard, California 93030

	BEACEN WAVE UPRUSH STUDY STATION NO. APDOYO BURRO (#3)	
	DESIGN WAVE: Ho'= 400 FT., PERIOD T= 6 SECONDS	
	DESIGN TIDE: + 8,75 M.L.L.W. DATUM	
	$Ho'/gt^2 = (0.0/32.7(0)^2 = 0.0052$	
	I. BREAKING WAVE HEIGHT	
	ASSUME B.W. DEPTH AT ELEV. $\frac{11.0}{0.04}$ MLLW, $x_p = 30$ FT. BW SLOPE= $\frac{1.2}{0.04}$ $\frac{1.0}{0.04}$ FT.	
	H _b / Ho' = 1.18, FIG. 7-3, SPM.	
	H _b = 1.18 x 60.0 = 7.08 FT. H _c = 0.78 x 7.08. + 8.75 FT. =+14.3 MILL	
	X = (4.0-(9.25 X 0.04)) X 7,08 FT. = 10,0 FT. 1, BN 20/8 OKAY	
•	II. BREAKING WAVE DEPTH	
	11 / gt2 = 7:08/ 202/20 = 0.000)	i
	d _b / H _b = 1.075 , FIG. 7-2, SPM.	
	$d_b = 1.075 \times 7.08 = 7.00$ FT. (ELEV. +1.) MILW)	i
	III. BREAKING WAVE VELOCITY	
	$V_{\text{max}} = \sqrt{gd_b} = \sqrt{32.2 \times 7/(0)} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} = \frac{15}{15} =$	
	IV. BREAKING WAVE UPRUSH LIMIT	
	ASSUME UPRUSH AT ELEV. + 19 MLLW, THEN AVE. UPRUSH SLOPE= 11) / 1).9 = 9.3	
1.2	R/Ho' = 0.00, FIG. 7-11, SPM. $K = 1.040$, FIG. 7-13 SPM.	
	UPRUSH ELEV. R = (R/Ho! X Ho' X K) + DESIGN TIDE	
	R = (0, 40 x 4,0 x 1.044) + 8,75 FT. MLLW = +12.52 FT. MLLW DATUM	^
.a	= +12.02 FT. HOW DATUM	10

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PACIFIC ENGINEERING GROU.

CONSULTING ENGINEERS 1956 PALMA DRIVE, SUITE J VENTURA, CA 93003 P: (805) 654-9283 F: (805) 654-9286

STA	NAVE UPRUSH STUDY TION NO. <u>APDOYO BURRO (#</u> 3)	
DES	IGN WAVE: Ho'= 9.0 FT., PERIOD T= SECONDS IGN TIDE: +B.75 N.L.L.W. DATUM	
Ho'	$/gt^2 = 9/32.2(4)^2 = 0.0044$	
<u>I. I</u>	ASSUME B.W. DEPTH AT ELEV2.5 MILW, X = 50 FT. BW SLOPE = 2.0 / 50 = 0.07 FT.	
	$H_b / H_0' = 1/23$, FIG. 7-3, SPM. $H_b = 1/23 \times 9.0 = 1/.07$ FT. $H_c = 0.78 \times 1/.07 + 8.75$ FT. = 17.4 MLLh	٠
TT	X _p = (4.0-(9.25 X , 04)) X //.07 FT. = 40 FT. : 800 2000 0219 BREAKING WAVE DEPTH	
LI.	$II_b / gt^2 = 11.07/32.2(8)^2 = 0.0054$	ı
	$d_b / H_b = 1.05$, FIG. 7-2, SPM. $d_b = 1.05 \times 11.07 = 11.40$ FT. (ELEV2.85 MILW)	i
III.	What = $\sqrt{gd_b}$ = $\sqrt{32.2 \times 11.60}$ = $\frac{19.3}{9.0}$ FT/sec. $\frac{d_5}{11.60} = \frac{11.60}{9.0} = 1.29$	
IV.	ASSUME UPRUSH AT ELEV. + 13.0 MLLW, THEN AVE. UPRUSH SLOPE= 208 15.85 = 13.) 76	91
	R/Ho' = 0,40 ,FIG. 7-11, SPM. K = 1001 , FIG. 7-13 SPM.	
a.	UPRUSH ELEV. R = $(R/Ho! \times Ho! \times K)$ + DESIGN TIDE R = $(O.HO \times 9.0 \times 1.01)$ + $B.75$ FT. MLLW = $+12.93$ FT. MLLW DATUM = $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$ FT. $+12.43$	(8)
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AFROYO BURLO BEACH
SANTA BARBANA, CA:

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CONSULTING ENGINEERS 1956 PALMA DRIVE, SUITE J

VENTURA, CA 93003 P: (805) 654-9283 P: (805) 654-9286

BEACEN WAVE UPRUSH STUDY
STATION NO. ARDOYO BURRO (#3)
DESIGN WAVE: Ho'= 10.5 FT., PERIOD T= 10 SECONDS
DESIGN TIDE: +8.75 M.L.L.W. DATUM
Ho'/gt2= 10,5/22(10)2=0,0032
I. BREAKING WAVE HEIGHT
ASSUME B.W. DEPTH AT ELEV6,0 MLW, X = 50 FT. BW SLOPE= 1,5 / 50 = 0,03.
H _b / Ho' = 1.27 , FIG. 7-3, SPM.
H _b = 1.27 x 10.5 = 13.3 FT. H _c = 0.78 x 13.3 + 8.75 FT. =19.2 MLIA
Xp = (4.0-(9.25 X ,03)) X 13.3 FT. = 49.5 FT. 250 : BW SLOTE OKAY
II. BREAKING WAVE DEPTH
Hy / gt2 = 13.3132.2/10)2 = 0.0041
$d_b / H_b = 1.075$, FIG. 7-2, SPM.
d = 1.075 x 13.3 = 14.3 FT. (ELEV5.4 MILIN)
III. BREAKING WAVE VELOCITY
$V_{\text{max}} = \sqrt{gd_b} = \sqrt{32.2 \times 14.7} = 21.5 \text{ FT/sec.}$
IV. BREAKING WAVE UPRUSH LIMIT
ASSUME UPRUSH AT ELEV. + 10 MLLW, THEN AVE. UPRUSH SLOPE= 373 / 15.4 = 23.9
R/Ho' = 0.29, FIG. 7-11, SPM. $K = 1.00$, FIG. 7-13 SPM.
UPRUSH ELEV. R = (R/Ho! X Ho' X K) + DESIGN TIDE
R = (0.29 x 10.5 x 1.00) + 8.75 FT. HLLW = +11.8 FT. MLLW DATUM
= +11.3 FT. WAVD DATURE

BENGAL ENCONEERING MEGA LANE STEPS AFROYO BURLO BEACH SANTA BALBARA, CA: JOB# 101
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CONSULTING ENGINEERS 1956 PALMA DRIVE, SUITE J VENTURA, CA 93003 P: (805) 654-9283 F: (805) 654-9286

CONSULTING	ENGINEERS DRIVE, SUITE J	PENCAL ENCONESIZING	ENGINEER RUB		
VENTURA, CA		APROYO BURLO BEACH	REV.		
	83 F: (805) 654-9286	GANTA BARBANA, CA.	ŖĔV.		
	-				
	BEACEN	WAVE UPRUSH STUDY			
STATIO	ON NO. APROYO BURRO (* 3)	· · · · · · · · · · · · · · · · · · ·		
DESIGN	N WAVE: Ho'= 3.0 FT.,	PERIOD T= 12 SECONDS	•		
DESIGN	N TIDE: + 8.75 M.L.L.W.	DATUM	•		
Ho'/gt	2= n.0/m.2(12)2=	0,00065			
	EAKING WAVE HEIGHT				
A E	Assume B.W. Depth at eley. 1 BW Slope- 0.8 20	$\frac{205}{100}$ MLLW, $x_p = \frac{20}{100}$ FT.			
н	$H_{\rm b} / {\rm Ho'} = 2.03$	FIG. 7-3, SPM.			
H _b = 2.03 x 3.0 = (0.) FT. H _c = 0.78 x (0.) + 8.75 FT. = +13.5 MLLh					
$x_p = (4.0 - (9.25 \times 0.04)) \times (0.1)$ FT. = 22.1 FT.					
	REAKING WAVE DEPTH	2			
	1 gt2 = (0,1 132.2(12)				
	$I_b / I_b = 0.97$				
d	13 = 0.97 x (0.1	= 5,92 FT. (ELEV. +2,8)			
	REAKING WAVE VELOCITY		ds = 5,92 22,0		
V	$\text{max} = \sqrt{\text{gd}_b} = \sqrt{32.2 \text{ X}} = \sqrt{32.2 \text{ X}}$	5,92 = 13,8 FT/sec.	Ho' 31 22.0		
	BREAKING WAVE UPRUSH LIMIT	, .	· .		
		MLLW, THEN AVE. UPRUSH SLOPE-			
	• •	7-11, SPM. $K = 1.062$, FIG.	7-13 SPM.		
	PRUSH ELEV. R = (R/Ho! X Ho!				
. R	$x = (2.80 \times 3.0 \times 1.0)$.062) + <u>8.75</u> FT. MLLW =	7.7 FT. MLLW DATUM 7.4 FT. MAYO DATUM		

JOB# 101 ·

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PACIFIC ENGINEERING GROUP

BEACEN WAVE UPRUSH STUDY
STATION NO. APRONO BURRO (#3)
DESIGN WAVE: Ho'= 1.0 FT., PERIOD T= 14 SECONDS
DESIGN TIDE: 49.45 M.L.L.W. DATUM
Ho'/gt2= 1.8/32,2(14)2=0,00044
I. BREAKING WAVE HEIGHT
ASSUME B.W. DEPTH AT ELEV. +3.0 MLLW, X = 20 FT. BW SLOPE- 0.8 / 10 - 0.04 P
$H_b / Ho' = 2.29$, FIG. 7-3, SPM.
Hb = 2.29 x 2.8 = 0.4 FT. H = 0.78 x 0.4 + 8.75 FT. = +13.75 MILLA
Xp = (4.0-(9.25 x 0.04)) x 4.4 FT. = 23.2 FT.
II. BREAKING WAVE DEPTH
11 / 8t2 = 4.4/32.2(14)2 = 0.001.
d _b / H _b = <u>0.955</u> , FIG. 7-2, SPM.
d _b = 0.955 x (0,4 = (0.) FT. (ELEV. +2.05 MLLN)
III. BREAKING WAVE VELOCITY As Coll = 12.2 × /2.1 = 14.0 = 1.7
$V_{\text{max}} = \sqrt{gd_b} = \sqrt{32.2 \text{ X} (l_1)} = 14.0 \text{ FT/sec.}$ Ho Z.8
IV. BREAKING WAVE UPRUSH LIMIT
ASSUME UPRUSH AT ELEV. + 10.0 MLLW, THEN AVE. UPRUSH SLOPE= 79 13.35= 5.9701
R/Ho' = 3.45, FIG. 7-11, SPM. $K = 1.0000$, FIG. 7-13 SPM.
UPRUSH ELEV. R = (R/Ho! X Ho' X K) + DESIGN TIDE
R = (3.49 x 2.8 x 1.000) + 8.75 FT. HLLW = +19.0 FT. MLLW DATUM
= 418,5 FT. MAST DATUS
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CONSULTING ENGINEERS 1956 PALMA DRIVE, SUITE J VENTURA, CA 93003 P: (805) 654-9283 F: (805) 654-9286

STATION NO. <u>APPOYO BURRO (#3)</u>
DESIGN WAVE: Ho'= 1.7 FT., PERIOD T= 10 SECONDS
DESIGN TIDE: 18.75 M.L.L.N. DATUM
Ho'/gt2= 1.7/32.2(16)2=0,000mg.
I. BREAKING WAVE HEIGHT
ASSUME B.W. DEPTH AT ELEY. 3.0 MLLW, $x_p = 25$ FT. BW SLOPE= $1 / 25 = 0.04$.
H _b / Ho' = <u>2.48</u> , FIG. 7-3, SPN.
Ho = 1.48 x 2.7 = U.7 FT. Ho = 0.78 x 10.7 + 8.75 FT. =+14.0 MILL
Xp = (4.0-(9.25 x 0.04)) x Ui7 FT. = 24.3 FT. 2251. Bus shope OKA
II. BREAKING WAVE DEPTH
$H_b / gt^2 = U.7 / 30.2 / (U)^2 = 0.00081$
$d_b / H_b = 0.95$, FIG. 7-2, SPM.
$d_b = 0.95 \times 0.7 = 0.4$ FT. (ELEV. 2.35 MILLW)
III. BREAKING WAVE VELOCITY Vmax = $\sqrt{gd_b}$ = $\sqrt{32.2 \times Ur4}$ = 14.4 FT/sec. $\frac{d_5}{Uc} = \frac{0.4}{2.7} 22.37$
$V_{\text{max}} = \sqrt{gd_b} = \sqrt{32.2 \times Ur4} = 14.4 \text{ FT/sec.}$
IV. BREAKING WAVE UPRUSH LIMIT
ASSUME UPRUSH AT ELEV. + 18 MLLW, THEN AVE. UPRUSH SLOPE= 80 15.7 = 5.5
$R/Ho' = \frac{3.55(7-11)}{2.65(7-11)}$, FIG. 7-11, SPM. $K = 1.07$, FIG. 7-13 SPM.
UPRUSH ELEV. R = (R/Ho! X Ho' X K) + DESIGN TIDE
R = (3,7 x 2.7 x 1.07) + 8.75 FT. MILW = +19.4 FT. MILW DATUM
= +18,9 FT. MSL DATUM

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CONSULTING ENGINEERS 1956 PALMA DRIVE, SUITE J VENTURA, CA 93003 P: (805) 654-9283 F: (805) 654-9286

BEACEN WAVE UPRUSH STUDY
STATION NO. ARDOYO BURRO (#3)
DESIGN WAVE: Ho'= 6,470 FT., PERIOD T= 10 SECONDS
DESIGN TIDE: +8.75 M.L.L.W. DATUM
Ho'/gt2= 5,43 /32,2(19)2= 0.00052
I. BREAKING WAVE HEIGHT
ASSUME B.W. DEPTH AT ELEY. 010 MLW, X=30 FT. BW SLOPE= 1.2 / 700 = 0.04 . P
H _b / Ho' = 2,17, FIG. 7-3, SPM.
H _b = 2.17 × 5.43 = 11.8 FT. H _c = 0.78 × 11.8 + 8.75 FT. = 17.9 MLL
xp = (4.0-(9.25 x 0.04)) x 11.8 Ft. = 42.8 Ft: Bw score ax
II. BREAKING WAVE DEPTH
$H_b / gt^2 = 11.6 / M.2 (18)^2 = 0.001$
$d_b / H_b = 0.975$, FIG. 7-2, SPM.
d _b = <u>0.975 x 11.8 = 11.5 FT</u> . (ELEV2.75 MLLW)
III. BREAKING WAVE VELOCITY Very F. (7d) = 132 2 × 1/5 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7 - 19.7
$V_{\text{max}} = \sqrt{gd_b} = \sqrt{32.2 \times 165} = 19.7 \text{ FT/sec.}$ Ho 5.47
IV. BREAKING WAVE UPRUSH LIMIT
ASSUME UPRUSH AT ELEV. + 14 MILW, THEN AVE. UPRUSH SLOPE- 208 / 14.75 = 12.4
R/Ho' = 1/3 ,FIG. 7-11, SPM. K = 1/0/ , FIG. 7-13 SPM.
UPRUSH ELEV. R = (R/Ho! X Ho' X K) + DESIGN TIDE
R = (1.3 x 5.43 x 1.01) + 8.75 FT. HLLW = +15.9 FT. MLLW DATUM
= +15.4 FT. MSL DATUR
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MEGA LANE STEPS
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GANTA BANDANA, CA

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PACIFIC ENGINEERING GROUP

CONSULTING ENGINEERS

1956 PALMA DRIVE, SUTTE J VENTURA, CA 93003

P: (805) 654-9283 F: (805) 654-9286

PACIFIC ENGINEERING GROUP PROJECT JOB# PAGE CONSULTING ENGINEERS EENGAL ENGINEERING ENGINEER META LANE STAINCASE ANNO BURRO BEACH SANIA BALBARA, CA. 3500 EAST CAMINO AVENUE #250 DATE OXNARD, CA 93030 REV. P: (805) 278-9283 F: (805) 485-6730 REV. WAVE IMPACT POLCES ON STRUCTURE AT HORIZ. CONTROL LINE TOTAL (PA PINAMIC STATIC ELEY. NAVO 270° 90° NUD 270° 90° 1800 04180 8,0 400 684.8 1144.8 4.60 325 425 11009.8 9.0 420,8 1080.8 949,8 460 400 305 205 881.8 10.0 4100 305 400 225 1014.8 590.8 11.0 B17,8 400 992.8 325 492.8 460 325 12.0 153.8 400 428.0 888,8 205 4100 325 13.0 224.8 U89.8 409 460 400 34.8 325 14.0 460 MOO 2000 1025.8 325 325 740.8 15,0 460 305 6.096 561.8 705 400 234.8 497.8 10n.8 16,0 460 172.8 300 460 325 156B18 108.8 433,8 17.0 460 325 460 325 44.8 504.8 34.8 18,0 460 25 400 205 DRUMSH OF UPLIET FORCE WAUB ELEV. NAVO UPLIET FROSESSED PSF ny 7.18 8.0-19.0 460 PyF 201 5,08 377 PSP 4.88 21 3/3 PSF 3,00 22'

150 PSP

185 PSF

120 PSE

LOO PSP

2.88

1.80

0.80

23

241

251

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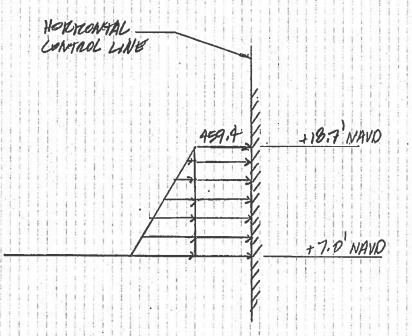
CONSULTING ENGINEERS
3500 EAST CAMINO AVENUE #250
OXNARD, CA 93030
P: (805) 278-9283 F: (805) 485-6730

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GANSTA BARRARA, CA.	REV.

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WAVE FORCES AT STRUCTURE



HC NAVD Umax 15,65 8/5 +13.8' 20 0,0 6 500 9.01 40 B 40. +16.9 1913 17/5 50 21,5 27/5 10,5 +18,7 10 500. LOOVEHING X 13.8 F1/5 3.0 12 400. 22' +13.0

5. 2.8' 14 sec. +13.25' 14.0 FT/s 23'

4. 2.7 10 sec. +13.5 14.4 F1/5 25?

7. 5.43 1B sec +17.4 19.2 7/5 431

* SINCE THE STRUCTURE FACE (HORIZ CONTROL LINE) IS SEMINARD OF THE TRESIEN SWL ". PREKEN WAVE VELOCITIES BENJAIN CONSTRUT AT UMAX.

POIN = (21.57/5)2(04.0) = 499.4 PSF

APPENDIX E

AMERICAN WOOD PROTECTION ASSOCIATION STANDARDS

MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

> Pacific Engineering Group 3500 East Camino Avenue Suite #250 Oxnard, California 93030

USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD

Jurisdiction: AWPA Subcommittees T-1, T-2, T-3, T-4, T-8, P-7/T-9, and T-10

Adopted in 1999, amended in 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009.

This Standard was developed by AWPA's Technical Committees in an open, consensus-based process. Any modifications, deviations, or exceptions to this Standard invalidate any references to this Standard and nullifies any statements of compliance with this Standard.

IMPORTANT: Wood processing and treated wood are regulated by a number of organizations in addition to AWPA (e.g., U.S. EPA, governments). The existence of AWPA Standards for treated products does not imply that all other regulatory bodies recognize of permit the use of the particular combination of preservatives, processes, and/or wood species listed in the AWPA Standards.

- Introduction to the Use Category System
- Service Conditions for Use Category Designations
- Guide to Commodity Specifications for Treated Wood End Uses
- Standardized Preservatives
- Standardized Wood Species
- Commodity Specifications:
 - A. Sawn Products
 - B. Posts

- Crossties and Switch
- Poles D.
- Round Timber Piling
- Wood Composites
- Marine (Salts Water) Application G.
- Fire Relardants
- Nonpressure Application
- onpressure Composite
- Barrier Protection System

SECTION 1: INTRODUCTION TO THE USE CATEGORY SYSTEM

Protection Association (AWPA) designates what preservative systems and retentions have been determined to be effective in protecting wood products under specified exposure conditions.

The strength of the UCS and its focusing that all wood uses can be placed into one of five major Use Categories that clearly describe the exposure conditions that specific wood clearly describe the exposure conditions that specific wood products can be subjected to in veryice. The major Use Categories are further broken down into sub-categories to define the associated degree of bludegradation hazard and product service life expectations or specific products and exposure conditions. It addition to the five Use Categories for biodeterioration, there is a sixth and separate Use galegory for fire retardant applications. The Use Category designations are described in detail in Section 2 below.

The Use Category system is designed to help specifiers and product uses locate the appropriate A WPA. Standards.

and product users locate the appropriate AWPA Standards that provide listing of preservatives deemed acceptable for specific products and end-use chairments.

The user of the AWPA Standard U1 should first become familiar with the major differences between the Use Categories and the expected service conditions as described in Section 2. This into section is then the service conditions as described in

Section 2. This information is then associan commettion with Section 3: Guide to Treated Wood End Uses to determine the specific Commodity Specification of the Standard that lists the appropriate preservative requirements for that use.

When purchasing under the Use Category System, material

orders should include the specific commodity, Use Category

The Use Category System (UCS) of the American Wood designation, Standard UI Commodity Specification, wood tection Association (AWPA) designates what preservative species, preservative and any special requirements such as preterms and retentions have been determined to be effective in or post-treatment preparations (including conditioning and

Wherever practicable, material should be manufactured in (Estimation prior to treatment to eliminate the necessity for subsequent cutting or boriffs of the treated wood.

lik assessment documents and models (e.g., Best Management Practices have been developed by the Western Wood Preservers institute (www.wwpinstitute.org) for the use of CCA A CC Creosote, Pentachlorophenol and ACQ treated wood in adhatic environments. Projects calling for large volumes of treated wood immersed in (i.e., below the splath zone poorly circulating bodies of water should be evaluated on an individual basis using risk assessment

procedures.
There are a number of other AWPA Standards that compliment Standard U1 for wood treated with preservative systems. These include:

Standard T1: Use Category System: Processing and Treatment Standard, that governs the preservative retention and penetration requirements, processing limitations, quality control and inspection requirements for treated wood.

Miscellaneous (M) Standards for Quality control and inspection items

Analytical (A) Standards to determine conformance of preservative systems, penetration, and retention.

Refer to the Introduction to this Book of Standards at the front of this edition for additional information.

SECTION 2: SERVICE CONDITIONS FOR USE CATEGORY DESIGNATIONS

The following is a breakdown of the Use Categories used by AWPA to describe the exposure conditions that wood may be subject to in service. This is also given in table form on the next page to summarize the major differences between Use Category groupings.

UC1 INTERIOR/DRY

Wood and wood based materials used in interior construction not in contact with the ground or foundations. Such products are protected from weather and interior sources of water such as leaking plumbing, condensate, pools and spas. Examples are interior furniture, construction furnishings, and millwork.

UC2 INTERIOR/DAMP

Wood and wood based materials used for interior construction that are not in contact with ground, but may be subject to dampness. These products are continuously protected from the weather but may be exposed to occasional sources of moisture. Examples are interior beams, timbers, flooring, framing, millwork and sill plates.

UC3 ABOVE GROUND (Exterior)

UC3A ABOVE GROUND Protected -- Wood and woodbased materials used in exterior construction that are coated and not in contact with the ground. Such products may be exposed to the full effects of weather, such as vertical exterior walls or other types of construction that allows water to quickly drain from the surface. Examples are coated millwork, siding and trim.

UC3B ABOVE GROUND Exposed -- Wood and wood based materials used in exterior construction and notificontact with the ground. Materials do not require in exterior coating, but may be finished to achieve a desired aesthetic appearance. Materials are used for a variety of applications in either horizontal and vertical positions such as decking, sills walkways, railings and fence pickets.

Note: Retentions above the minimum specified for materials in this use category may be required for products such as crossarms, where the individual components are difficult to maintain, repair or replace and are critical to the performance and safety/of the entire system.

UC4 GROUND CONTACT

UC4A GROUND CONTACT General Use -- Wood and wood-based materials used in contact with the ground fresh water, or other situations at avorable to defotionated. Examples are ferree poils, deck posts, guardral posts, structural lumber, impers, and utility poles located in regions of low natural potential for wood desay and insect attack.

UC4B GROUND CONTACT Heary Daty -- Wood and wood-based material used in opitical with the ground either in severe environments, such as horticultural sites, in climates with a high potential for deterioration, in critically important components such as utility poles, building poles and permanent wood foundations, and wood used in salt water splash zones. This category includes utility poles used in moist temperate climates.

UC4C GROUND CONTACT Extreme Duty (Wood and wood based materials used in contact with the ground either in very severe environments or climates demonstrated to have extremely high potential for deterloration; in critical structural components such as land and fresh water piling and foundation piling, and utility poles located in semi-tropical or tropical environments.

UC5 MARINE USE

UC5A MARINE USE Northern Waters — Wood and wood based materials exposed to salt and brackish water generally to the north of New Jersey on the entitional and north of San translated on the west coast to the extent that the marine borers can attack them. This includes areas where thundra quadripunctate is present, but lacks those borers ligited under UC5B and UC5C. This includes piling and bracking, bulk-heading on other construction that is actually exposed at some line during the year to salt water.

UCSB MARINE USE Central Waters -- Wood and wood based materials exposed to salt and brackish water between New Jersey and Googia on the east coast and south of San Francisco on the west coast to the extent that the marine borers can attack them. This includes areas where creosote tolerant Limnorta tripunctata is present, but lacks those boreralisted under UC5C. This includes piling and bracing, bulk-heading or other construction that is actually exposed at some time during the year to salt water.

UCSC MARINE USE Southern Waters -- Wood and wood based materials exposed to salt and brackish water south of Georgia and along the gulf coasts in the eastern U.S., as well as Hawaii and Pnerto Rico, to the extent that the marine borgers can attack them. This includes areas where Marie ia and Sphaeroma are present. This includes pilities and bracing, bulk-heading or other construction that is autually exposed at some time during the year to salt water.

UCF FIRE RETARDANT

UCFA FIRE RETARDANT Interior -- Wood and wood based materials intended for fire protection and used in interior construction where wood material is not in contact with the ground and is protected from exterior weather.

UCFB FIRE RETARDANT Exterior -- Wood and wood based materials intended for fire protection and used in exterior construction that is not in contact with the ground or with foundations, but may be exposed to full effects of weather such as intermittent rain, dew, sunlight and wind. Materials are applied to vertical, exterior walls, inclined roof surfaces or other types of construction that allow water to quickly drain from the surface.

TABLE 2-1: SERVICE CONDITIONS FOR USE CATEGORY DESIGNATIONS

1.		772.000		22.00
USE CATEGORY	SERVICE CONDITIONS	USE ENVIRONMENT	COMMON AGENTS OF DETERIORATION	TYPICAL APPLICATIONS
UCI INTERIOR/ DRY	Interior construction Above Ground Dry	Continuously protected from weather or other sources of moisture	Insects only	Interior construction and furnishings
UC2 INTERIOR/ DAMP	Interior construction Above Ground Damp	Protected from weather, but may be subject to sources of moisture	Decay fungi and insects	Interior construction
UC3A ABOVE GROUND Protected	Exterior construction Above Ground Coated & rapid water runoff	Exposed to all weather cycles, not exposed to prolonged wetting	Decay fungi and insects	Coaled millwork, siding and trim
UC3B ABOVE GROUND Exposed	Exterior construction Above Ground Uncoated or poor water run-off	Exposed to all weather cycles including prolonged wetting	Decay fungt and insects	Decking, deck joists, railings, fence pickets, uncoated
UC4A GROUND CONTACT General Use	Ground Contact or Fresh Water Non-critical components	Exposed to all weather cycles, normal exposure conditions	De tay Alphgi light insects	Fence Jeck and guardrail losts gossties & utility poles law decay areas)
UC4B GROUND CONTACT Heavy Duty	Ground Contact or Fresh Water Critical components or difficult replacement	Exposed to all weather cycles, filsh decay potential includes salt water to be		building poles, horticultural posts, crossies & utility poles (high deepy areas)
UC4C GROUND CONTACT Extreme Duty	Ground Contact or Fresh Water Critical structural components	Exposed to all weather cycles, sovere environments extreme de ay potential	Decay fing and insets with extrems potential for blodeterioration	Land & Hrashwaler piling, foundation piling! crossties & Litility poles (saveir decay areas)
UC5A MARINE USE Northern Waters	Salt or brackish water and adjacent mud zone Northern waters	Continuous marine exposure (salt water)	Sall water organisms	Pling, bulkheads, bracing
UCSB MARINE USE Central Waters	Salt or brackish waler and adjacent mud zona NJ to GA, south of San Francisco	Continuous marine exposule (saluvialer)	Salt water organisms Including creosole tolerant Linfforth trippidctata	Piling, bulkheads, bracing
UC5C MARINE USE Southern Waters	Salt or bracklift yater and adjacent mud kone South of GA Sulf Coast, Hawalfrand Puerto Rico	Continuits maine exposure (salt water)	Salt Water organisms Including Martesia, Sphaeroma	Piling, bulkheads, bracing
UCFA FIRE RETARDANT INTERIOR	by codes Above Ground Interior construction	Continuously proteded from weather or other sources of molyufe	Fire	Roof sheathing, roof trusses, studs, joists, paneling
UCRB FIRE RETARDANT Exterior	Fire protection as reduired by Gide Above Ground Exterior robstruction	Subject to welling	Fire	Vertical exterior walls, inclined roof surfaces or other construction which allows water to quickly drain

SECTION 3: GUIDE TO COMMODITY SPECIFICATIONS FOR TREATED WOOD END USES

Section 6 of the UCS-U1 Standard lists standardized preservative systems and required retentions for specific commodities and end-uses. This section is designed to help direct users and specifiers to the governing sub-section of Section 6 for the treated wood application, and to help identify the appropriate Use Category for the intended use. Some commodities not retention for a specific application beyond that suggested by Section 2 of this Standard due to the critical nature of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of the line of t

Table 3-1: Guide to commodity specifications for treated wood end uses, arranged by use.

Table 3-1: Guide	to commodity specifications to	r treated wood end uses, arrang	ed by use.	Fig.	- FI
			Use		Specification
Commodity	Use	Exposure	Category	Section	Special Regs.
Bender Board	General	Ground Contact or Fresh Water	4A 🖎	X	
Bulkhead Sheathing	Non-Marine	Ground Contact or Fresh Water	4A) AS	
J	Marine	Brackish or Salt Water	5A-5B-5C	A G	6.1-6.4
Cant Strips	Building Construction	Above Ground	3B	A	4.1
Composite Lumber	Structural	Above Ground, Exterior	3B	F	À
(PSL & LVL)	Highway Structural, General	Ground Contact or Fresh Water	ALCA	F	
` ′	Highway Structural, Important or	Ground Contact or Fresh Water	V 4B	A V	
	High Decay				Ä
	Highway Structural, Critical or	Ground Contact or Fresh Water	4C	A	V
	Severe Decay				
Cribbing	Highway	Ground Contact on Freel Water	46x 1	AMA	***
Crossarms, Sawn	General Use	Above Grounds Exterior	_ 3B	A	4.5
,	Critical or Hard to Replace	Above Ground Exterior	TAY.	3	
Crossties, Switchties		Ground Contact of Fresh Water	TANS	C Q	
,	Important and/or High Decay	Ground Contactor Fresh Water	AB	Č 🔏	
	Critical and/or Severe Decay	Ground Contact of Fresh Water	, Vic	c	
Decking	Painted/Unpainted	Above Ground, Exterior	3B	ASA C	7
· ·	Building Construction, General	Ground Contact or Fresh Water	7 4A	4 8 5	9.0
•	Highway Bridge Structural,	Above Ground	4B	A X	4.3
	Critical/Severe Decay		,	AB	***
Decks, Residential	Decking (Painted/Unpainted)	Above Ground, Exterior	e l		
-	Joists Joint		∂B _λ ₩	l A	
	Railing Components				
	Joists 💮	Ground Contact of Fresh Water			
	Support Posts (Sawn)		4A-	A	
Expansion Boards	General (S)	Ground Contact or Fresh Water	4A	A	
Fascia Boards	Painted/Gonted	Above Ground, Exterior	∂ 3Λ	A	
	Unpainted	Above Ground, Exterior	3B	A	
Fence Pickets	Painted/Coated	Above Ground, Exterior	3A	A	
	Ulibabited A	Above Ground, Exterior	3B	Α	
Pence Rail	Painted/Coated	Above Ground, Exterior	3A	A	
A 🖫	Unpainted A W	Above Ground Exterior	3B	Α	
	Stockyard, Agricultural	Above Ground, Baterior	4A	Α	
Floor Plate	Building Construction	Above Ground, Potentially Wet	3B	A	
Flooring	Above Ground, Interior	Proteoted Insect Only	1	A	4.1
	Above Ground, Interior	Proteofed, Damp	2	Λ	4.1
	Residential/Commercial, Veranda	Above Ground, Exterior	3B	Λ	4.1
Flooring, block	Above Ground	Row Hunddity	2	A	
	Above Ground	High Humidity	3A	Α	
Furniture (Indoor A	Protected, Insect Only	1	A	
`	Quidoor A	Above Ground, Exterior	3B	Λ	
	Outdoor	Ground Contact	4A	Α	
Furring Strips	Indoor	Above Ground, Damp	2	Λ	
	Outdoor	Above Ground	3B	٨	
Gazebo Material	Painted/Coated	Above Ground, Exterior	3A	A	
	Unpainted 🚯	Above Ground, Exterior	3B	Λ	

Table 3-1: Guide	to commodity specifications i	for treated wood end uses, arran			
	••	_	Use		y Specification
Commodity	Use	Exposure	Category	Section	Special Reqs.
Glue Laminated	Above Ground, Interior	Protected, Insect Only	1	F	
Beams	Above Ground, Interior	Protected, Damp	2	F	
	Above Ground Structural	Exterior	3B	F	
	(Painted/Unpainted)	0 10 11 5 1 7	ļ		
	General Structural, Highway Structural Non-Critical	Ground Contact or Fresh Water,	4A	F	
		Low Decay Ground Contact or Fresh Water,	4B	F	
	Saltwater Splash	High Decay	40	A	
	Highway Critical Structural	Ground Contact or Fresh Water,	4C A	AF.	
	·	Severe Decay			
Handrails/Guardrails	Highway Construction	Above Ground, Exterior	3 B	A A	4.3
Joists	Above Ground, Interior	Insect Only	·	A	4.1
	Above Ground, Interior	Above Ground, Damp	2	A	4.1
	Building Construction	Above Ground, Exterior	33B	A	
	Building Construction	Ground Contact/Fresh Water	40	A	
Laminated Veneer	San Commonita I number		El.	A SA	
Lumber (LVL)	See Composite Lumber				
Landscape Ties	General	Ground Contact or Fresh Water	4A	EL ASS	
Lattice	Painted/Unpainted	Above Ground, Exterior	3B, \	ANA	
Lumber/Timbers	Above Ground, Interior	Insect Only	1 CON	N.	4.1
	Above Ground, Interior	Wood Exposed to Damphess	2	A	4.1
	Above Ground, Exterior,	All Applications	3A	500	A
	Coated/Painted				
	General, Including	Above Ground, Reserior, Unconted	(3)3	A	M
	Agriculture/Farms		A V		
	Food Harvest and Storage	Above Cronini, Exterior			
	Roof Decking,	Above Oround, Exterior	7		4.1
	Flooring/Subflooring Food Contact	Above Ground, Exterior	A4	AB	
	General, Including Refaining	Ground Contact or kresh Water	44 69	A .	
	Walls, Edging, Agri-/Mariculture	Ground Contact of mesn water		A	
	Boats, Furniture, Gazebos			ŀ	
	Compost Plant/Mishroom		AZA		
	Royes Flumes			,	
	Fire Escapes Byteriot Exposed	Above Ground and Ground Conject		A	
	Wet Industrial Processing Areas	Above Ground and Ground Contact	۵	Ā	
	Cooling Towers Brine Storage, Highway	Fresh Water Contact		Ā	4.4
	Brine Storage, Highway	Ground Contact or Fresh Water		В	4.1
	Construction Materials		i		
6	Playeroflid Equipment	Ground Contact of Fresh Water		В	4.3
A (Permanent Wood Foundation	Ground Contact and Above Ground	4B	A	4.2
	Highway Construction	Ground Contact or Fresh Water		A	4.3
	Residential/Business Structural				
	Crib Walls Retaining Walls,	Ground Consect or Fresh Water			
W.A'	Crib Wallsekelaning Walls,	Ground Contact or Fresh Water		A	
	Important Sinistarial, Greenhouse Maring Out of Water and Above	A. hard Sentest			0.00
	Ground Ground	Sancarator Spiasii	1	A	G-2.9
(Marine Out of Water and Ground	Salt Water Salach	4C	A	G-2.9
,	Contact . A	Spare Water Sprasir	40	A	G-2.9
	Aquaculture	Fresh Water		Α	
	Residential/Business Structural	Ground Contact or Fresh Water		A	
	Support Support	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			
	Marine, Aqua Mariculture,	Brackish or Salt Water	5A-5B-5C	G	6.1-6.4
	Highway, Boats			_	
	Fire Retardant, Pire Protection	Interior,	FΛ	Н	
	Fire Retardant, Fire Protection	Exterior	FB	H	

Table 3-1: Guide to commodity specifications for treated wood end uses, arranged by use, (conf.)

radie 3-1: Gui	ue to commodity specifications	for treated wood end uses, arran		The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	
a			Use		ty Specification
Commodity	Use	Exposure	Category	Section	Special Reqs.
Millwork, Trim	Above Ground, Interior	Insect Only	1	Α	4.1
	Above Ground, Interior	Above Ground, Damp	2	A	A.I
	Painted/Coated	Above Ground, Exterior	3٨	A	740
	Unpainted	Above Ground, Exterior	3B	A	
Parallel Strand	See Composite Lumber				
Lumber (PSL)	-			N. T.	A B
Pergola	Pergola	Ground Contact or Fresh Water	4A	A	
Piles, Foundation	Building Construction,	Ground Contact	4C	A _E	
	Completely Embedded in Soil		A	A FA	
Piles, Round	Highway Construction	Ground Contact or Fresh Water	4Ç	BA	,
	Marine/Highway Construction	Brackish or Salt Water	5A-5B\5C\	G	6.1-6.4
Piles, Sawn	Residential/Business Structural	Ground Contact or Fresh Water	4B	A	4.3
	Support	Glound Contact of 11cm Water	1D W	^ 2	A. 7.3
	Residential/Business Structural	Ground Contact or Fresh Water	Mac.	_A \	13
	Support, Critical			7	
Plywood	Above Ground, Interior, Subfloor		2	AT TO	M .
	General, Including	Above Ground, Exterior	₩ 3B		
	Agriculture/Farms		A	BB	
	Food Harvest-Storage-Contact	Above Ground, Exterior		A BF	
	Roof Decking,	Above Ground, Exterior		F	2.6
	Flooring/Subflooring			A	
	General: Including Edging,		MAN A		A
	Agriculture, Mariculture, Boats,			ļ _	
	Furniture, Gazebos,	Ground Contact of Fresh Water	/ Ay	F	
	Compost/Plant/Mushroom Boxes	·			
	Flumes				
	Brine Storage, Highway Construction Materials	Ground Contact or Fresh Water	7	ARZA	B-4.1
	Wet Industrial Processing Areas	Ground Contact or Fresh Water	.4		
	Fire Escapes, Exterior Exposed	Above Ground and Ground Contact		ST.	
	Marine Marine	Salt Water Splash	AID C	F	
	Permanent Wood Foundation	Ground Contact and Above Ground		A	40
	Marine/Highway Construction,	19.63	A	A	4.2
	Boat Building	Brackish of Salt Water	SA SB SC	G	
	Fire Retardant Bire Protection	Interior	FA	H	
	Fire Retarding, Pire Protection	Raino	♪ FB	H	
Poles (Round)	Agricultural Use Utility	Ground Contact or Fresh Water	7	11	
· oleo (Robila)	riginalinal desponing	Law Decay	4A	D	
	Agriculture Utility, Highway	Ground Contact or Fresh Water,			
	Construction, Lighting	Moderate Decay	4B	D	
	Building Structural	Chound Contact or Fresh Water	4B	В	4.4
A	Wility, Lighting	Ground Contact or Fresh Water,	40	В	4.4
A 4	Spinity, Eighting	High Decay	4C	D	
Poles (Sawfi)	Agricultural/Parm	Ground Contact or Fresh Water	4A	A	
	Structural Hullding	Ground Contact or Fresh Water,	7//	Λ	
	Structural Building	Moderate Decay	4B	Α	
Poles	Mility Poles	Ground Contact or Fresh Water,			
(Glue Laminated)		Low or Moderate Decay	4A/4B	D	6
(Utility Poles	Ground Contact or Fresh Water,			
		High Decay	. 4C	D	6
	FOREST A CA	ALIGN LAVOUS	L		

Table 3-1: Guide	to commodity specifications for	or treated wood end uses, arran	ged by use.	(cont.)	
			Use	Commodity	y Specification
Commodity	Use	Exposure	Category	Section	Special Reqs.
Posts	General, Fence, Highway				
Round, 1/2 & 1/4	Construction Including Guide,	Ground Contact or Fresh Water	4A	В	
Round	Sign and Sight		.		
	Playground Equipment	Ground Contact or Fresh Water	4A	В	
	Highway Construction, Including	Ground Contact or Fresh Water,	4B	в	
	Guardrail Posts, Spacer Blocks	Moderate Decay	4B	В	
	Building Construction	Ground Contact or Fresh Water	4B	В	4.4
	Agricultural Used as Round	Ground Contact or Fresh Water,	4B		4,2,1
	Structural Members	Moderate Decay	46	A COL	4.2.1
	Brine Storage, Highway	Ground Contact or Fresh Water,	4D.	A B	4.1.2
		Moderate Decay	4B ₄	PA	4.1.2
Posts (Sawn 4 Sides)	General, Fence, Deck Support	Ground Contact or Fresh Water	4A	周 A	
	Highway Construction, General	Ground Contact or Fresh Water		A ,	4.3
	Playground Equipment	Ground Contact or Fresh Water	44	В	4.3
	Agricultural Use, Spacer Blocks	Ground Contact or Fresh Water	M _{4B}	4600	
		Moderate Decay	[6]		
	Important Building Structural	Ground Contact or Fresh Water	V4C	AND	
Purlins	Above Ground, Interior	Insect Only	1	A BAR	
		Above Ground, Damp	2 \		
	Painted/Coated	Above Ground, Exterior	3A	E ST	
	Unpainted	Above Ground Exterior	AB	K EL	
Shakes and Shingles		Above Ground Exterior	B	A .	4.6
Siding (Beveled or	Painted/Coated	Above Ground, Exterior		A	A
Not)		THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS OF THE PARTY AND ADDRESS		^ .	4.1
	Unpainted	Above Ground, Exterior	3B	A	
Sill Plates	Interior	Above Ground, Danip	2	A(Y)	4.1
Skirtboard	Post Frame Construction	Ground Contact	7 4A	(AAV Z))
Stakes (Sawn 4	Grape, Agriculture	Ground Contact/Fresh Water	4A	A VA	
Sides)	A B		۸ (
	See Composite Lumber			4	
Lumber					
Studs	Building Construction, Interior	Insect Only	AMA	Α.	.4.1
	Building Construction, Interior	Wood Exposed to Dampness	C2	Λ	4.1
Ties	Mine and Bridge	Ground Contact or Fresh Water	AA	В	
		Brackish or Salt Water A	5A-5B-5C	G	6.1-6.4
Trusses	Roof A	Insect Only	1	A	4.1
	Roof	Wood Exposed to Damphes	2	A	4.1
	Floor	Above Ground	3B	Ā	4.1
Utility Poles	Distribution, Transmission,				7,1
	Laminaled, General	Ground Contact or Fresh Water	4A.	D	
4	Distribution, Transmission	Ground Contactor Fresh Water,			
AAL	Laminated, Important	High Decay	4B	D	
A NO	Distribution, Transmission,	Ground Contactor Fresh Water,			
	Laminated Citical	Seyere Decay	4C	D	
Veranda supports	Veranda Supports	Ground Contact or Fresh Water	40	A	
·	T VICENTIAN PROPERTY	Orbitudes Shuract of Licent Agree.	4/1	/\	

SECTION 4: STANDARDIZED PRESERVATIVES

Preservatives for Pressure Treatment Processes

Preservative Abbreviation	P Standard Reference	Preservative	Retention Basis, as	Preservative Carrier
	<u> </u>	Oilborne and Creosote-Based	Dusto, no	
CR	P1/P13	Creosote	Creosote	Not applicable
CR-S	P2	Creosote Solution	Creosote	Not applicable
CR-PS	P3	Creosote-Petroleum Solution	Creosote 🖎	Hydrocarbon Solvent
PCP-A	P8/P9	Pentachlorophenol (Penta) Solvent A	PCP	Hydrocarbon Solvent
PCP-C	P8/P9	Pentachlorophenol (Penta) Solvent C	PCR	Light Hydrogarbon Solvent
Cu8	P8/P9	Oxine Copper	Copper	Light Hydrocarbon Solvent
CuN	P8/P9	Copper Naphthenate	Gopper	Hydrocarbon Solvent
твто	P8/P9	Bis (Tri-n-Butyltin) Oxide	Not Available	Hydrocarbon Solvent
CTL	P8/P9	Chlorothalonil	Not Available	Hydrocarbon Solvent
CPF	P8/P9	Chlorpyrifos (use cobiocide Chlorothalonil)	Not Available	Hydrocarbon Solvent
PXTS	P19/P9	Oligomeric Alkylphenol Polysulfide	PXTS	A or Hydrocarbon Solvent
		Waterborne, Acid-based	MX.	
CCA	P5	Chromated Copper Arsenate Type C	Metal Oxides	Vater
ACC	P5	Acid Copper Chromate	Metal Oxides	Water
		Waterborne, Alkali-based (amine/ammonia)		
ACZA	P5	Ammoniacai Copper Zino Arsenate	Metal Oxides	Water
ACQ-A	P5	Ammoniacal Copper Quat Type B	CuO + Quat	Water
ACQ-B	P5	Ammoniacal Copper Quat Type B	CuO + Qual	Water
ACQ-C	P5	Alkaline Copper Quat Type C	CuO+ Quat	Water
ACQ-D	P5 🛕	Alkaline Copper Quat Type D	Coo + Quat	Water
CBA-A	P5 💜	Copper Azole Type	OI PHIBO; + azole	Water
CA-B	15)	Copper Azole Type B	Cu + azole	Water
CA-C	A 1864	Copper Azola Type	Cu + azoles	Water
CX-A	PS	Copper ADO Type A	CuO + H ₃ BO ₃ + HDO	Water
(A N		Waterborne, Other		
SBX	P5	Thorsanic Horon (SBX)	B ₂ O ₃	Water
CDDC	P5 🙉	Copper bis(dimethy)dithincarbamate) CDDC	Copper	Water
CuN-W	P5 🔪	Walerborne Copper Naphthenate	Соррег	Water
EL2		4,5-dichloro-2-fractyl-4-isothiazolin-3-one (DCQI) and 2-Intidazolidinimine, 1-((6-chlore3-byridinyl)methyl)-nitro (Imidaeloprii).	DCOI + Imidacloprid	Water
PTI	P5	Repliculazole Tebuconazole Imidacloprid	Propiconazole Tebuconazole Imidacloprid	Water

Preservatives for Pressure Treatment Processes (continued)

Prescryative Abbreviation	P Standard Reference	Preservative	Retention Basis	Preservative Carrier
		Fire-retardants		
FR-1	P17	FR-1	Not Available	Water
FR-2	P17	FR-2	Not Available	Water

Preservatives for Non-Pressure Treatment Processes

Tildad of other	MILETINE SERVICE			E CA
Preservative Abbreviation	P Standard Reference	Preservative	Regention Basis	Preservative Carrier
		Oilborne and Creosote-based	7 11 113	NRA
CR	P1/P13	Creosote	Creosole 🔷	Not applicable
PCP-A	P8/P9	Pentachlorophenol (Penta) Solvent	PCP (Hydrocarbon Solvent
CuN	P8/P9	Copper Naphthenate	Copper	Hydrocarbon Solvent
ТВТО	P8/P9	Bis (Tri-n-Butyltin) Oxide	NorAvulable	Hydrocartion Solvent
		Waterborne, Other		
AAC	P5/P8	Alkyl Ammonium Compound	Not Agailable	Water/Hydrocarbon Solvent
		Millwork Systems		ACA II
DCOI	P8/P9	4.5-dichlor 2-Nectyl 4-Isothiazolin-3-one (Isothiazolin (Note b)	Not Available	Light Hydrocarbon Solvent
ТРВС	P8/P9	3-iodo-2 propynyl butyl carbamate (Notab)	Not Available	Light Hydrocarbon Solvent
PPZ	P8/P9	1-[2(Adichlorophenyl)-4-propyl-1,3- dioxalan Or L-methyll-1Hel,2,4-triazole (Propiconazole) (Note b)	Not Available	Hydrocarbon Solvent
ТЕВ	P8/P9	I (24(chloropheny) Phyl y (1,1- dimethylethyl) 1H (12,4 Triazole-1 Ethanol (Tebuconazole) (Noteb)	Rot Available	Hydrocarbon Solvent

SECTION 5: SPECIES AND SPECIES GROUPINGS REFERENCED IN AWPA STANDARDS

The individual species and species groupings listed herein have been included in AWPA Standards because experience has shown that it is possible to treat them successfully, with at least some preservative systems. Listing of a species in these tables does not imply that they are listed for all preservative systems, or that a preservative system appropriate to specific applications is listed or available.

Most species are treated either as sawn or round commodities. Other species groupings, such as those listed in the gradebooks of various ALSC-accredited grading agencies may contain a mix of species which cannot be readily separated, or properly treated as a whole. Grade marks are an acceptable means of species identification, but only sawn material is grade-marked.

To predict treatability, species should be positively identified. The following list includes species groupings that are commonly treated under AWPA Standards, which are described under Notes 1-9 below. Treating of other species groupings should be avoided unless individual species identification can be made by a means acceptable to both buyer and seller. However, acceptance under AWPA

Standards is ultimately governed by preservative penetration and retention.

The listing of a preservative with a species of species group does not necessarily imply the species of the species group is treated regularly with any specific preservative. Prior to specifying a species for a given application, it should be cross-referenced with specific Commodity Specifications in Section 6, and information should be obtained on the availability of a species preservative combination.

Species Treatability and Variability. Some species are difficult to treat to the requirements of the AWPA Standards even when incised. Individual pieces or lots within a species or species grouping market, sometimes significantly in their treatability. It for a specifying a species or species group for any community and preservative, a guide information should be obtained about the treatability, and the variability of the species of species group.

les on species group.

The ecognized common and scientific names of wood pegies used in AWPA Standards are as follows

Notes and Footnotes for Species Names and Listings in Section 5 Tables UCS-U1 - Use Category System User Specification for Treated Wood Brothets

1 Coastal = West of Summit of Cascade Mountains; Intermountain East of Cascade Summing

² Usually, but not always.

- ³ For sawn products treated with CCA. Western larch was removed from AWPA Standards with prejudice. For ammoniacal copper preservatives and pentachlorophenol, Western larch was removed from AWPA Standards without prejudice.

- Note 1: Southern Pine includes little elliottii (slash), e echipata (shortlesh), h. palustris (longleaf), P. taeda (loblolly)
 Note 2: Mixed Southern, pine includes all Southern Pine species plus P. virginiana (Virginia) and P. serotina (pond)
 Note 3: Hem-fir includes I suga heterophylla, Abies anacolor (white), A. magnifica (Cal. red), A. grandis (grand), A. procera
 (nobel) A analylis (pacific silver)
 Note 4: Hem-fir North includes T suga heterophylla, Abies amablis
- Note 5: Spruce Pine Bir includes Abjestnalsamea, A. laslocarpa, Riveg engelmannii, P. glauca, P. mariana, P. rubrens, Pinus Banksiana, P. contoria
- Note a Spruce-Pine-Fir West (NEGA) rules, but only by the following Western Canadian agencies: Alberta Forest Roducts Association (A.P.A), Caribou Lumber Manufacturers Association (CLMA), Canadian Mill Services Association (COII), literar Lumber Manufacturers Association (ILMA), Northern Forest Products Association (NFPA). If includes bies Lasiocarda Picea engelmannii, P. plauca, P. mariana, Pinus contorta

 Note 7: Red Oak includes Quercus rubba, Q. whulna, Q. marilandica, Q. kelloggii, Q. falcata, Q. laurifolia, Q. elllipsoidalis, Q. muttallii, Q. palustris, Q. accipies, Q. shumardii, Q. laevis, Q. phellos, and Q. nigra.

 Note 8: Scots Pine-Ger is Pinus Sylves it is from Germany as certified by a qualified third-party agency.

 Note 9: Patula Pine is Pinus palula from South Africa and a component of African Montane Pine as certified by a qualified third-party agency.

- third-party agency.

USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD

U1-09

Species Names and Listings in 111 - He. Category System: Herr Specification for Theated Wood Decelerate	for Treated	Wood P	polarete											
							l'a	Sawn Products	ucts					
Common					UCS Listings	stings					Shakes	Cooling	Sawn	Bridges
Name(s)		UC1&2	UC3	UC4A	UC4B	UCAC	UCSA	UCSB	UCSC	PWF	Shingles			highway
Dopelas-fir Coastal (Oregon Pine/Red Fir) Paramonic merciesii var. merciesii Interior (Mountain or Intermentain) Pseudocua merciesii var. glauca	ciesti?	×	×	×	×	×	×	×	×	×		×	×	×
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Hickory Carya spp. Vellow Poplar											9			
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USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD	Species Names and Listings in U1 - Use Category System: User Specification for Treated Wood Products
U1-09	Species Names and 1

		Posts	ħ.	Structural Poles/Posts	les/Posts	Crossties	ľ	•	Utility Poles		
∺ 4∄	nutic re(s)	UC4A UC4B	E CAB	Farm UC4Bmod	building 1774B	switchties 1104	TICAA II	General	Gine-lam	Therr	TTCAC
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Note 1		×	×	×	×	×	×	×	×		
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		×	×	×	×		×	×	×		
P. resinos	art. oceanpa	×	×	×	×	×	×	×			
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	ensis		F	1							
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all Quercus sp.	sp.		A (×)				
Acer sp.											
Acer rubrum Nussa em	E		A		V						
Liquidambar spp.	r spp.		*	A				Ŋ			
Carya spp. Liriodendo	Carya spp.		-			*					
other	All other N.A. hardwood species				-	×					

USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD

U1-09

Species Names and Listings in U1 - Use Category System: User Specification for Treated Wood Products

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efir Coastal (Oregon Fine/Red Fir) Interior (Mountain or Interfacement)	grendosuga merciesti var. merciesti ² Podidosuga merciesti var. glauca	issit ³	××	×	×	×	×	×	×
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Ponderosa	P. ponderosa		××					2.00	
Lodgepole Eastern White Northern White)	Populoria C	A.A.	< ×						
	- Constant								
Caribbean (Ocotor Bonduras) Red (Norway)	P. extragal		×						
	Pinus Ribbra								
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Hem-fir	Note 3			×	×			>	>
Hem-fir North	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s				{			<	<
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		V							
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	all Quercus sp.		×			Y			
Red Oak	Note 7			×					
	Acer sp.							-	
Red Maple	Acer rubrum			×	X				
Black Gum	Nyssa spp.	Section 1							
Red (sweet) Gum	Liquidambar spp.		>)	Q	
ruckory Vellow Bonlor	Carya spp.			1			7		
a chow a upida	Linoaenaron numiera			>	>				

USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD

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Species Names and Listings in U1 - Use Category System: User Specification for Treated Wood Products	ducts								
		SP.	actural Con	Structural Composite Lumber	ber				
Common		PSL			LVL		Z	Marine Piling	
Name(s) Name(s)	UC1-3B	UC4A	UC4B	UC1-3B	UC4A	UC4B	UCSA	UCSB	UCSC
Douglac-fir Coastal (Oregon Pine/Red Fir) Interior (Mountain of Grace Strategies) Interior (Mountain of Grace Strategies)	×	×	×				×	×	×
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Northern White Cedar Traja occidentalis Incense Cedar Libocedrus decurrens				>				-	
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Oak	1	7		A	-				
Maple Acerso	2)								
			B		×	×	(
Black Gum Nyssa spp. Red (sweet) Gum			,			j			
				>		<u> </u>			
oplar	×	×		×	×	×			
Mixed Hardwoods All other N.A. hardwood species									

SECTION 6: COMMODITY SPECIFICATIONS

Section 6 provides a listing of all AWPA specifications for treated wood commodities. It is organized into a series of subsections for major commodity classifications (A-I below), and provides information on the listed preservative systems and species/species groupings that can be treated under AWPA Standards for each Use Category (use exposure condition). Use category descriptions are given in Section 2. If a user/specifier is unsure where to look up a specific commodity and end-use within these tables, they should consult Section 3 of this standard for specific commodity references.

In all cases, treated material should be clean of preservative deposits and suitable for its intended end use Material treated with creosote, creosote solutions, or oil borne preservatives in Use Categories UC1 through UC5 slightly supplied reasonably free of exudate and surface deposits. Material treated with waterborne preservatives shall be supplied tree of visible surface deposits.

Drying after treatment of material treated with waterborne preservatives is sometimes required or desirable for dimensional stability and should be specified. When drying after treatment is required, the moisture content in each piece of plymber shall not exceed 19% or that allowed by National Grading Rules for the species and size specified to be dried difficulties moisture content in each piece of plywood shall not exceed 18%.

SUB-SECTIONS OF SECTION 6:

COMMODITY SPECIFICATIONS

- A. Sawn Products
- B. Posts
- C. Crossties and Switchties
- D. Poles
- E. Round Timber Piling
- F. Wood Composites
- G. Marine (Salt Water) Application
- H. Fire Retardants
- I. Nonpressure Applications
- J. Nonpressure Composites (reserved)
- K. Barrier Protection Systems

Location of Some Specialized Commodities, not otherwise obvious:

Permanent Wood Foundation (PW)

Both Lumber and Ricwoods Commodity Specification A, Section 4

Playground Material

Lumber, rounds (Posts/poles) Commodity Specification B. Section 4.3

Round Building Poles and Posts

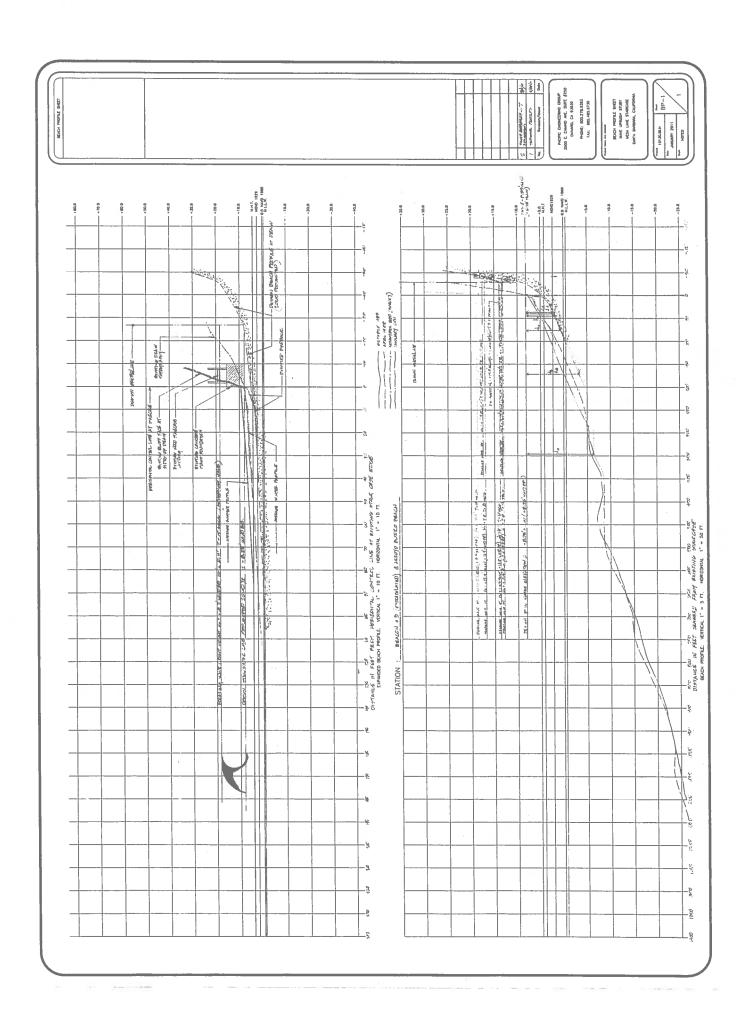
Both poles and posts: Commodity Specification B. Section 4.4

APPENDIX F

DESIGN BEACH PROFILE SHEET BP-1 TOPOGRAPHICAL SURVEY

MESA LANE STAIRCASE COASTAL ENGINEERING REPORT SANTA BARBARA, CALIFORNIA

> Pacific Engineering Group 3500 East Camino Avenue Suite #250 Oxnard, California 93030





Bengal Engineering, Inc.

Civil, Bridge, Hydraulics, Structural & Highway Engineers

TECHNICAL MEMORANDUM

Date:

March 10, 2011

Project:

Lower Mesa Lane Steps Repair

Santa Barbara, California

Client:

City of Santa Barbara, Parks Department

ATTN: Ms. Jan Hubbell, AICP, Parks Project Manager

Subject:

Engineering Geologic Opinion of the Design Options Presented in Bengal

Engineering's Conceptual Plan Submittal

INTRODUCTION

Bengal Engineering was recently asked by the City of Santa Barbara to provide an engineering geologic opinion regarding the three (3) conceptual designs presented in Bengal's recent (Feb. 3, 2011) Conceptual Plan Submittal. The three design options were provided so that the City may choose one (1) repair option, and this option would then become the focus of the Preliminary Design (30%) phase.

This professional opinion is thought to be a necessary component of the package with which the City will approach the California Coastal Commission to begin the process of obtaining a Coastal Development Permit (CDP).

The existing stairs provide pedestrian access from the bluff edge, located at the south end of Mesa Lane, to the beach below. It is our understanding the stairs were originally constructed in 1982 and refurbished in 1990. The lowest staircase and its timber pile foundation, along with concrete pedestal landing, are located on the beach and subject to wave uprush (CEG, 2011) during high tide and surf conditions. Both the lowest staircase and its concrete pedestal footing are in poor condition and require repair in the form of replacement.

The undersigned visited the project site on Wednesday, March 2, 2011, and his observations and opinions, specifically with regards to existing and future slope stability and other geologic hazards, are summarized in this technical memorandum.

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SITE CONDITIONS

The project site is located in the surf zone (i.e. beach) at the base of a roughly 140-foot high coastal bluff, or terrace. The north end, or top, of the Lower Mesa Lane steps is located at the end of an asphalt-paved walkway that extends from the south end of Mesa Lane. Immediately inland of the existing, lower stairway is 0.5:1 (h:v), ~ twenty foot (20') high slope in which thinly bedded shale bedrock is exposed. The top of the stairs marks roughly the edge of the gently south-sloping marine terrace. The portion of the coastal bluff between the exposed bedrock at the base (i.e. at the inland edge of the beach) and the terrace surface above is moderately to thickly vegetated, with locally "hummocky" topography, and slope gradients varying from 1.5:1 to 4:1. Storm water runoff from the slope above is conveyed through the project site via a natural, v-shaped drainage which discharges at the beach in line with the existing timber landing.

At the time of our site visit, the wave-cut platform (i.e. beach area) was covered with a thin veneer (approximately 2'-3') of beach sand with occasional bedrock outcrops. Winter and summer beach profiles can vary significantly, with a wider beach expected during the summer months. Over the course of an "average" winter storm season, the beach width will likely be narrower. During strong winter storms, in particular when combined with high tides, there may be periods where most, if not all, of the beach sand will be removed and transported via the dominant longshore current.

SITE GEOLOGY

Mapping during the undersigned's site visit indicates that the project location is underlain by the middle shale unit (upper and middle Miocene) of the Monterey Formation (Minor et al. 2006). Where exposed in the vicinity of the project site, the thinly-bedded fissile bedrock is tan to light brown, slightly moist to moist, slightly hard, slightly to moderately fractured. An occasional moderately hard to hard siliceous shale bed was observed in the stratigraphic section, and tar seeps were noted along some fractured areas.

A thin veneer of tan, well-graded, moist to saturated sand overlies the bedrock in the beach area below the project site.

Continuous bedding was observed within the project area. Bedding orientations measured vary from N74W to N78W, with dips from 19° to 24° SW. Regional mapping (Minor et al., 2006) indicates that the shales in this area are folded into a series of anticlines and synclines, with the fold axes striking to the northwest. Indeed, we observed and mapped a NW-striking syncline axis in the coastal bluff approximately 200' northwest of the project site. Widely-spaced, irregular joints and shears were observed in the bluff face. These joints and shears (i.e. minor faults) strike between N40E to N55E and dip both to the NW and SE at moderate angles. The drainage feature described above may be structurally controlled by a northeast-trending shear or fault.

GEOLOGIC HAZARDS

The bedding orientation is considered adverse with respect to the stability of the coastal bluff. The shallow bedding dips to the southwest, resulting in a "daylighted" bedding condition along the bluff face. Landslide debris, of an unknown depth or extent, was observed north of the project site (underlying higher segments of the Mesa Lane Steps) and along the coastal bluff to the SW of the project site. It should be noted that bedrock exposed in the coastal bluff and underlying the project appears to be unaffected by landslide movements.

The bluff above the project repair is considered prone to slope stability movements; in the form of translational sliding along bedding planes and to rockfall events, which may occur as waves attack the base of the bluff and as the result of earthquake shaking. Sloughing of weathered and/or fractured bedrock from the bluff can occur with little to no warning at any time. Quantifying the stability of the bluff above the project site is outside our scope of work.

<u>Liquefaction</u> is not a design consideration, as the foundation for the proposed repair will extend into bedrock. The beach deposits are too thin to produce any noticeable downdrag affect on the foundations during an earthquake. Consolidation of sediments due to seismic shaking is not considered a hazard. For a discussion on the risks associated with tsunamis, please see the Coastal Engineering Report by CEG (2011).

GEOLOGIC OPINION ON PROPOSED REPAIR

The proposed repair of the lower stairs and landing of the Lower Mesa Lane Steps is feasible from an engineering geologic perspective.

Regardless of the design option chosen, the damaged section of stairs and landing will be replaced with new elements constructed at the same location. In other words, the location of the proposed structural elements will not be shifted. The new stairs and landing are not expected to adversely affect or contribute to erosion or instability of the bluff face.

No protective devices for the bluff are proposed or warranted at this time.

Each design option presented in the Conceptual Plans shows the foundation elements extending a minimum of twelve feet (12') into bedrock. During construction, a licensed engineering geologist or geotechnical engineer should observe and approve that the foundation excavations are in accordance with the plans.



LIMITATIONS

Recommendations are provided in accordance with generally accepted professional engineering and engineering geologic principles and practice at this time in Southern California. We make no other warranty, either expressed or implied.

This professional geologic opinion was performed without benefit of a comprehensive geologic and geotechnical engineering report, which would include subsurface exploration, soil/rock laboratory testing, air photo interpretation, engineering analyses (including slope stability analysis), and construction recommendations. This comprehensive study and the associated report are not part of our scope of work at this time.

PREPARED BY:

Ed Pongacy-Batto

Ed Pongracz-Bartha, CEG 2370 Engineering Geologist

REFERENCES:

Minor et al., 2006, Preliminary Geologic Map of the Santa Barbara Coastal Plain Area, Santa Barbara County, California, Open File Report (OFR) 02-136.

California Geological Survey (formerly the California Division of Mines and Geology), 2000, Landslide Hazard Maps of Southeastern Santa Barbara County, California - DMG Open-File Report 99-12.

Pacific Engineering Group, Inc., January 24, 2011, Coastal Engineering Report (CER) for Mesa Lane Staircase Repair, Santa Barbara, CA, Project Number #10130.BEN.